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Prospects

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The Journal of the Canada/Newfoundland
Cooperation Agreement on Human Resource Development



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Building Excellence in People

Our human resource reaches its full potential when presented with technology and the opportunity to grow. It is then that form has function, imagination flourishes and artists from all fields create.

For Newfoundland and Labrador, the shape of the future will be determined by the extent to which the people of our province make the most of the social and economic changes that confront them. To become better equipped to meet those challenges, Newfoundlanders and Labradorians must be provided with the opportunities to improve their skills, increase their knowledge and take greater responsibility in the workplace. In short, we need to "build excellence in people".

This is the premiere issue of *Prospects*, a journal specifically designed to address issues in human resource development. This publication is a response to a need to inform individuals involved in education, business, labour and government of innovative initiatives taking place in the field of human resource development within this province.

Prospects has several key objectives. The first is to draw attention to the importance of and the issues surrounding human resource development. Hopefully, the journal will be a significant factor in raising the awareness and appreciation of this emerging issue. Secondly, the journal will describe innovative and creative activities taking place in the human resource development field, thus

enabling those involved to stay current, to learn from others, to develop contacts and, hopefully, to spawn new activities. Thirdly, the journal will provide a forum for meaningful discourse on practical and theoretical concerns relevant to human resource development. In that sense, it is very much a practitioner's journal. Finally, the journal will help build an understanding of the nature and scope of human resource development. Clearly, the classroom teacher, college instructor, private consultant, software developer, university professor and personnel officer are all working for the same goal, to build excellence in people.

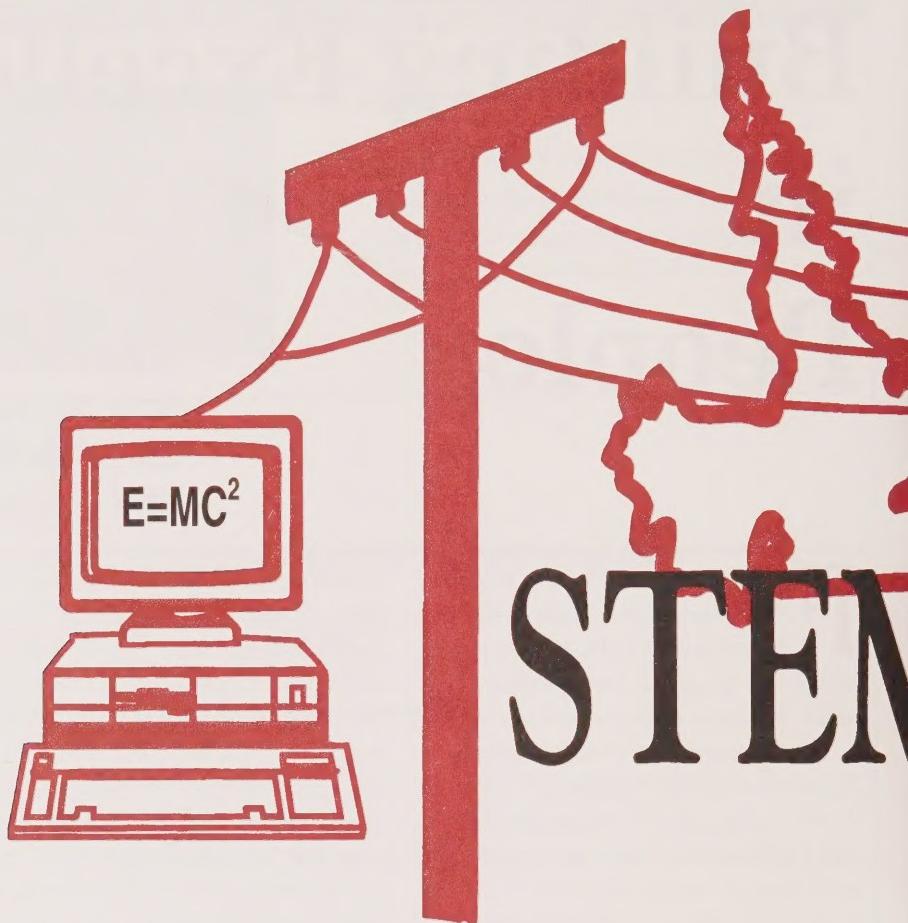
The journal is supported by the Canada/Newfoundland Cooperation Agreement on Human Resource Development (HRD). The Agreement recognizes the importance of the contributions that well-educated, creative and energetic people are making to the province and the potential for a journal which chronicles their contributions.

The projects profiled in the first issue have been drawn from the HRD Agreement. Moreover, the articles reflect a common theme - the importance of a positive attitude in effecting change. As the reader will become quickly aware, the individuals responsible for the innovative programs

highlighted here are progressive, enthusiastic and energetic. Indeed, one of the unique features of this program is the involvement of individuals who implement new ideas because they have identified a specific need and are attempting to address that need. They have a genuine interest in promoting excellence.

Future issues of *Prospects* will deal with many aspects of human resource development. They will address themes such as lifelong learning, professional development, management techniques, and the human resource development industry. The intention of *Prospects* is to highlight the exciting changes that are taking place in our schools, colleges and workplaces which are helping to create a new legacy - a society of better educated, highly skilled and self-motivated individuals. We believe that our human resource is by far our most valuable and holds the greatest potential.

Trudi Johnson
Albert Johnson
(editors)



providing an information highway for the province's educators

In the spring of 1991, the Atlantic Canada Opportunities Agency (ACOA) proposed to the provincial government the establishment of a state-of-the-art computer network across the province for educators who teach science, technology and mathematics. The Agency feels this is essential for the higher level of education which is needed to ensure the long-term success of commercial projects and to improve the provincial economy and employment opportunities.

A feasibility study of the proposed network showed that professional isolation and inexperience in many areas of technology are among the most serious impediments faced by educators, especially in science, technology education and mathematics. The consultants made an extensive study of educational networks throughout

North America and confirmed the value of having a teachers' network in this province.

Memorial University of Newfoundland was asked by ACOA to develop a full network and funding proposal. The project was run under the auspices of Dr. Jaap Tuinman, Vice-President, Academic, at Memorial University. Tuinman requested that Harvey Weir of Memorial University's physics department develop the proposal and carry out extensive consultations with various groups within the education system, both levels of government and the private sector.

The province-wide consultations and preparation of the proposal were activities that made up the first stage of this extensive five stage project. The first stage was completed in July, 1993. In the early period of stage two



Wilf Bussey and Leo Harlick assembled the hardware and software that make up the technical aspects of the network.

Harlick continues to administer the technical operation of the network as the systems manager. Also in this second stage the project staff is developing programs, piloting the system in over 200 schools, and carrying out demonstrations and training. Frank Shapleigh and his assistant, Dale Fraser, are conducting the training sessions.

Initially STEM~Net staff members planned to hold in-service sessions for school board office personnel and at least one individual in each of the schools that received hardware through the project during this stage. But the demand for training sessions grew beyond original expectations. Several school boards purchased their

own equipment, placed it in their schools, and encouraged teachers to take advantage of the new network. Many teachers who have their own computers have also requested access to STEM~Net. Because of these factors, the number of user accounts issued to date has far surpassed projected figures. The proposal forecasted that 2000 accounts would have been issued by the end of this fiscal year and that 40 per cent of these accounts would belong to active users who would be on-line approximately three hours per month. In reality, the STEM~Net staff has issued approximately 4000 accounts. Two thousand of these are classified as active users who avail of the network at least five hours per month.

Harvey Weir, the director of STEM~Net, is very excited about the results of the project to date.

"Feedback from teachers is extremely positive," says Weir. "They have been using the network extensively."

Figures indicate that on a per capita basis Newfoundland and Labrador teachers presently using STEM~Net avail of network services, such as the Schoolnet at Carleton University in Ottawa, more than any other group of educators in Canada.

STEM~Net now reaches 75 per cent of the schools in the province. Forty percent of the schools are connected directly to the system via hardware that is installed in the schools. The other 35 per cent of schools have indirect access through teachers who have computers and modems at home. It is estimated that 80 per cent of all the users in the system have access to the network from their homes.

The services available to STEM~Net users will continue to grow as the network develops. At present teachers can take advantage of electronic mail, general information bulletin boards and newsgroups, access a wide range of on-line general library and database resources, take some courses through distance education, and access the Internet, a worldwide network made up of college and university educators, researchers and libraries. The staff is hoping to add to the list of services in the fall of 1994 with on-line conferencing, provided suitable software can be found.

The STEM~Net staff is also very encouraged by the methods teachers have employed to put these new services to use. Lester Simmons, the computer studies coordinator with the Roman Catholic School Board for Labrador, Labrador West area, is enthusiastic about the potential of the system. "The network is certainly improving our ability to communicate and discuss problems that we are experiencing in our field." Simmons cited a problem he was experiencing with a piece of software. He described



Harvey Weir - STEM~Net Director

his problem in a message that he placed in a newsgroup and was pleasantly surprised by the volume of responses. He received advice from users on the island portion of the province and from teachers as far away as the United States. He claims that in Labrador West five to ten teachers per school have accounts and are active users.

On the east coast of Labrador, in Nain, two teachers are using the system for a different purpose. In cooperation with the STEM~Net staff and a professor at McGill University in Montreal, these teachers are taking a post-graduate certificate program in educational technology. The program is not offered at Memorial University at this time and the teachers would not have had an opportunity to do the courses without the aid of this form of distance education. The staff and the policy committee that administer the project are excited to note that in many different ways educators are using the new network to end the professional isolation that teachers in remote areas of the province have experienced for far too long.

The program development and training initiated in stage two will continue during the third stage of the project. When the network is fully operational throughout the province 8,000 full-time educators in nearly 500 schools will have access. In addition, more than 500 public-college educators on the 26 sites of the four public-colleges outside the St. John's area, and hundreds of resource people will be able to avail of STEM~Net. More than 40 per cent of public school educators and most of the college educators have an involvement with science, technology education and mathematics. It is anticipated that nearly 6,000 educators and resource people will use STEM~Net within the next four years.

This project is a leader in this

type of technology in Canada and the rest of North America. Plans are to ensure that every school in the province will have at least one computer with access to STEM~Net by 1995 and that there will be a computer with access to the network in every classroom by 1998. Both of these projections are one year ahead of similar programs underway in the rest of Canada and two years ahead of initiatives being pursued in many parts of the United States.

Although one goal of the project is to place a computer with access to the network in each classroom by 1998, students will not be given individual access to STEM~Net. Instead, students will use the network in group projects that are research-oriented and carefully monitored by their teachers. The focus of the network is on educators, not on students. From an economic development perspective, there are two reasons for this. First, student learning depends on the quality of the in-school learning environment. Teachers and instructors are the single most important factor in providing excellence in education. Teachers who have easy access to vast amounts of new and relevant information and have actively established lines of communication with other educators in their area can greatly enrich the learning experience for their students. Secondly, teachers need opportunities to prepare for leadership roles in an information-technology future that includes open-network access.

The future of STEM~Net is very promising. Work on posting the curriculum guides for courses taught in the province's schools will begin this summer and most will be available for downloading in WordPerfect and text formats within two years. Plans also include that government policy papers on education will be made available to teachers on-line to enable them to

offer their input on important educational issues.

The staff of the project is continually looking for ways to improve the system and make the flow of information more efficient. However, when the STEM~Net project enters its last two stages, the transition stage and the continuance stage, some difficult issues will have to be addressed. The telecommunications cost for the net-

opment goals of the province's teachers, program coordinators and consultants in science, technology education and mathematics. They are eager that STEM~Net operate with a philosophy of quality assurance and cost-effectiveness, provide the backbone of an emerging open-learning network throughout Newfoundland and Labrador, and help to end the professional isolation that many educators

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The staff of the project is continually looking for ways to improve the system.

work is currently excessive as far more users are taking advantage of the system at this stage in its development than was predicted. Hopefully, this problem will be solved with software that will allow teachers to download many of the services they use and then work with them off-line. The project was initiated with funding from several agencies and institutions but if the network is to survive, other sources of revenue must be found. Harvey Weir is optimistic about finding these financial resources. He hopes that the school boards, the Department of Education, Memorial University, the colleges, the Newfoundland and Labrador Teachers' Association and Newfoundland Telephone will be anxious to help provide the financing required to maintain the system annually.

The stakeholders in the STEM~Net project set out to establish an educators' network that would be driven by the curriculum-based, instructional and professional devel-

in our province experience. In many ways STEM~Net is meeting these goals. The response to the project has been overwhelmingly positive at this stage in its development as more and more educators make use of the resources available to them. It appears from this early stage that STEM~Net will live up to expectations and will provide the province with a significant contribution to education. Ω



Fishery Observers' Accreditation

business, labour and government looking to the future beyond the moratorium

The Fishery Observers' accreditation program is a special initiative which brings together government, business and labour in a common goal—the recognition of the fishery observer as a trained professional with a specifically designed set of skills. One of the program's key objectives is to ensure that fishery observers have the training to meet the changing needs of the workplace, a directive of particular relevance in light of the current fishery moratorium. From the workers' perspective, the widespread acceptance of occupational standards will provide greater job portability both provincially and nationally.

In the 1970s, the extension of

Canadian jurisdiction over territorial waters (the 200-mile limit) necessitated the hiring of fishery observers through the federal government's Department of Fisheries and Oceans. The job included collecting biological data on fish species and monitoring foreign and domestic vessels to ensure proper compliance with Canadian fishing regulations. Nevertheless, over the years a substantive degree of variance within the occupation became apparent in terms of reporting systems, data collection, job performance variables and vessel activity. At the same time, job descriptions and training programs varied throughout the country, leaving fishery observers with a low degree of job portability.

Today, the Department of Fisheries and Oceans retains its autonomy over fishery observers through certification and training programs. However, the task of supplying fishery observers is contracted out to the private sector. In Newfoundland and Labrador, Beothuck Data Systems, through its corporate division, Seawatch, is the sole employer of fishery observers. Two years ago, Seawatch and Teamsters Local 855 identified the need for occupational accreditation of the fishery observer group. Together, they started a project to design and implement an accreditation program.

The steering committee set up to coordinate the accreditation process is chaired by Deborah Thiel of Nexus Consultants Inc. The committee consists of representatives of Teamsters Local 855, Seawatch, Fishery Observers, the Marine Institute, the Department of Fisheries and Oceans, the Department of Fisheries, the Department of Education, and Employment and Immigration Canada. Formulating an industrial profile of the fishery observer and completing an occupational analysis are among its initial challenges. The Marine Institute in St. John's is designated as the post-secondary institution responsible for curriculum development and the training of those entering the occupation as well as the retraining of fishery observers already employed. Maintaining and renewing the curriculum will be an on-going process as occupational standards evolve.

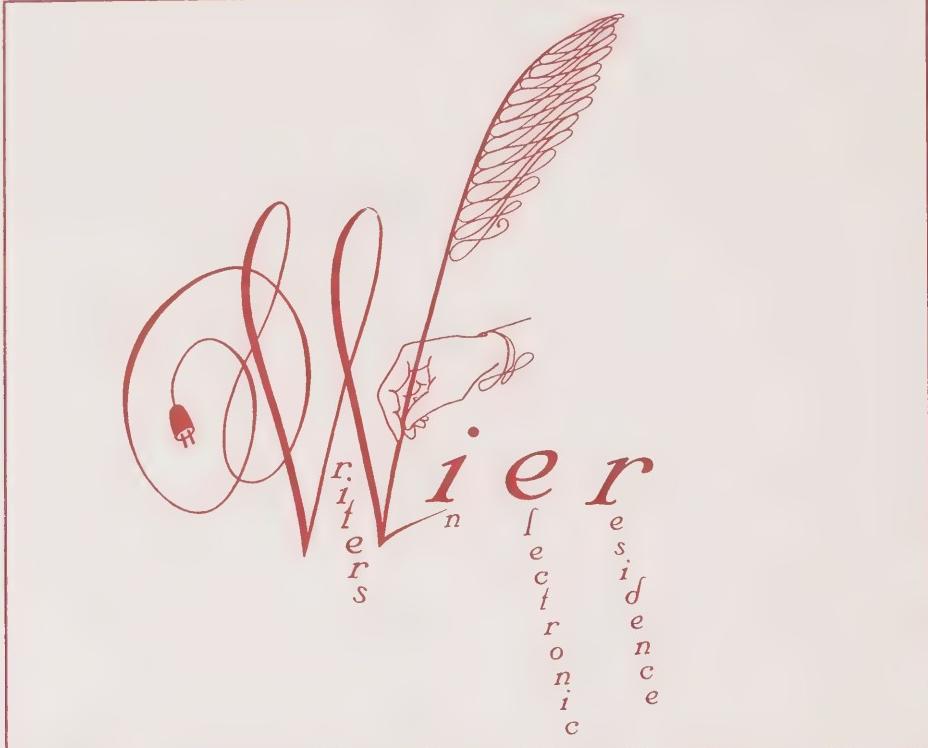
Consultant Deborah Thiel notes that this type of training marks the first such accreditation program in the world. Government, business and labour see this as a progressive step, one that looks beyond the moratorium to the potential of the future. "We are putting ourselves in the driver's seat, exactly where we should be," says

Thiel. The program hopes to increase productivity and competitiveness through the establishment of occupational standards and formal training. For the individual fishery observer, accreditation will increase job security by raising the professional standards of the occupation. Long-term goals involve gaining formal recognition through provincial, national and international certification. Skills acquired through the training program will provide fishery observers with a wide range of abilities transferable to similar occupations. Specifically, formal training will include further skill development in marine sciences, the environment, navigation, law of the sea, applicable computer programs and other related subjects.

The model of accreditation designed here, being the first of its kind, will be marketed in regions of the world where fishery observers are required. Hopefully, prospective fishery observers will be attracted to the formal training program offered by the Marine Institute in Newfoundland. A bi-product of the accreditation process, then, will be the expansion of the province's post-secondary education program for the purpose of training the relatively new occupation of fishery observer. Ω

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teachers on the Burin Peninsula have a new tool to motivate their students to write



"I saw that it was transforming attitudes towards writing," says Frank Kennedy, the Language Arts Coordinator for the Roman Catholic School Board for the Burin Peninsula, about his first impression of the research that became the catalyst behind introducing Writers In Electronic Residence (WIER) to the school district. Kennedy first encountered the concept while he was attending York University in Toronto. A colleague and the creator of WIER, Trevor Owen, was researching a program that links, via email, famous Canadian writers with students involved in creative writing across the country. Kennedy read interviews that were held with teachers and students involved in the program. Encouraged by what he had read, he became eager to start the project in his own school district.

Soon after Kennedy returned to his duties as Language Arts Coordinator he sold the idea to his school board. The equipment necessary for each school to take part in

new computer networking systems had already been purchased. After dealing with some technical difficulties, all the telephone lines, modems and computers were soon in place and working. The next step was to introduce the teachers to the program.

Teachers from Marystown, Burin, Rushoon, Lamaline, St. Lawrence and Lawn took part in a two-day inservice on the project. Trevor Owen was brought in as the facilitator and two teachers from each participating school attended the workshop. Many aspects of the project were covered during the two days. Topics included the purposes and practices of WIER, training in the technical aspects of networking and trouble-shooting the hardware and software, and the integration of WIER in a writing program.

The WIER project is administered by Trevor Owen out of York University. Students and authors are grouped into what he calls "electronic literary salons" (MACLEAN'S/ December 27, 1993). Schools from geographically diverse areas of the

country communicate through email with each other and with the authors assigned to their conference and salon. Schools are placed into a conference according to the level of students who attend. Ten authors are currently acting as professional mentors and guides for 1994. Emily Hearn and Ken Roberts respond to elementary school students on the Write With You conference, Ken Roberts and Kevin Major communicate with the intermediate students on the Word for Word conference, and Susan Musgrave, Trevor Ferguson, Marilyn Bowering, Daniel David Moses, Patrick Lane, David McFadden and Dave Margoshes correspond with high school students on the Wired Writers conference.

Each of the schools in the Roman Catholic School Board for the Burin Peninsula participating in the project is placed in a conference according to grade level, and then in a salon with as many as four other schools. St. Joseph's Academy in Lamaline is a K to 12 school with a population of 367 students. The program is used at the primary and elementary level in the elementary conference, Write With You. They are in salon four with St. Stephen's in Stephenville; Churchill Elementary in North York, Ontario; Northumberland Board of Education, Cobourg, Ontario; and Minitoras, Manitoba, a town of 600 inhabitants near Lake Winnipeg.

Having their work downloaded into the system and presented to students in other parts of the country is a great thrill for the students. Missy Cousins is a Grade 3 student at St. Joseph's. She shared her story with students at Churchill Elementary in North York, Toronto.

How I Got Lost

*Early one sunny morning while
Missy was playing outside, a near-sighted*

pelican swooped down and carried her off. The pelican headed for a wooded area and dropped Missy in a bunch of trees. A family of bears came along and took her to their home in a cave. They cared for her, fed her and kept her warm. She learned to swim like a bear and hunt for food. They grew to love her like their own and because of her long blond hair, they gave her the name, Goldilocks. One day while she was trying to catch a fish in a brook, she slipped and fell in. The moving water carried her downstream. Just below her, a man and a woman were berrypicking on a marsh. The lady saw the blond haired girl in the water. She ran and picked her up and wrapped her in a blanket. As she was being dried off, Missy peeped at the lady from under the blankets. She wasn't afraid and she felt a

Dear Missy,

Does this story relate to a story told already? Did Missy's parents feel sad when Missy flew away with the pelican? We really enjoyed reading your story. You also have a good imagination.

from Katrina (Gr.4), Sharon (Gr.4) and Lauren (Gr.3)

Ken Roberts is the author who commented on the stories in salon four during the month of March.

Missy, this is Ken. I love the opening sentence. It is wonderful. Aha! I notice that you do have the parents laugh and cry when Missy returns to them. I liked your story very much. You write

Students enjoy sharing their work with children and well-known authors in other parts of the country.

kind of closeness. The lady kept looking at her and soon realized that the little girl in her arms was her little Missy. She laughed and cried and danced so happy to have her back. As Missy grew older anytime she saw a bear in a zoo or on TV she felt such love and also sadness because she would never forget her other family.

Katrina, Sharon and Lauren are the students who responded to Missy's story.

extremely well. It is important to think like each character, trying to imagine how each one would react to a certain situation.

Eric Ayers and Catherine Benteau, the teachers who direct the program at St. Joseph's, are excited about the results that have been achieved so far. Benteau spends a great deal of her own time preparing the students' work to be downloaded into the system. "Our students have a wider audience than just their lang-



Jay Martin - Student Assistant

uage teacher and their fellow students." she says. "Students in other schools and the writers pick up on ideas and styles that their classroom teacher might not see and will make a comment about them." Ayers is very pleased that the program seems to be a real conduit for general knowledge about other parts of the country. He tells about Jody Stacey, a grade two student at the school. Jody had written a story called *Unwelcomed Visitor*, about a shrew that had invaded the family home. The beast was eventually subdued by Tiger the cat. Ghana Khoraych, a grade 5 student at Churchill Elementary, in North York, responded:

Dear Jody,

I liked your story. It was great. I also liked the title you gave it. I've never heard of a shrew before. What is it? Did you make it up or is it just something I've never heard before? You're lucky you had a cat named Tiger.

Your friend, Ghana, Grade 5

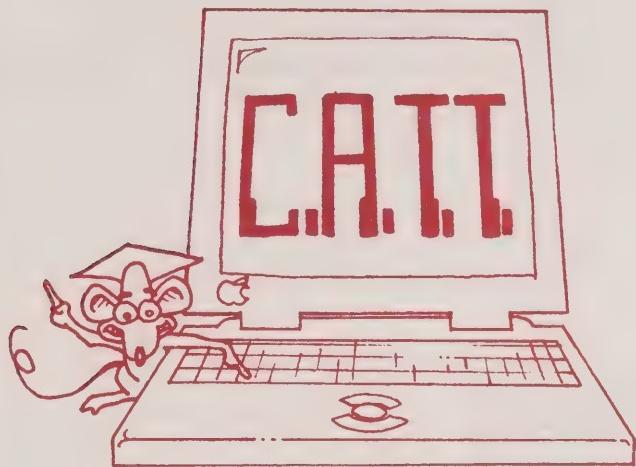
In Lawn's Holy Name of Mary all grade school, Kathy Stacey and Charlene Walsh direct the program. Stacey is the vice-principal and a language arts teacher. Students in grades four, five and six are involved in the program. Stacey talks enthusiastically about many positive results they have achieved since they started the project and of its great potential. "Our students are often asked what it's like to live by the sea and what they like best about living where they are. We also get information from the other schools about what life is like where they live. What's most reassuring is when you see students recognizing how much they really have in common with children in other parts of the country." Stacey would like very much to involve her high school stu-

dents in the project but because of financial restrictions placed on the program at York University each school is only permitted to participate at one conference level. Jay Martin, a level two student at Holy Name of Mary, has played a key role in the project at his school since its inception. Jay has quite a facility with computer hardware and software and has a special interest in writing. He has been active in preparing the work of the younger students for downloading and has been printing the comments that have come back from the authors and the other schools in their salon.

Frank Kennedy believes that the program has been a great success. "Teachers and students alike are excited about writing," he says. The students have significantly broadened their audience for their writing and teachers have found a new tool that motivates their students to write. Kennedy is eager to have the project spread to the other schools in his district so all the students under the board's jurisdiction could benefit from this unique and useful application of computer networking. Ω

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Computer Assisted Teacher Talk



putting new technology to work in professional development

Teachers in the Exploits Valley Integrated School Board are utilizing a new approach to professional development. Twenty-two teachers from primary and elementary schools in the district are actively involved in Computer Assisted Teacher Talk (C.A.T.T.). The participants are using laptop computers and modems to communicate, via email on STEM~Net, with each other and with teachers in the rest of province and the world. These electronic discussions include topics such as teaching strategies for various subject areas, articles from professional journals, techniques in classroom management, and other professional development issues. The response of the participants to the program has been overwhelmingly positive and other teachers in the district are anxious to participate in a proposed second phase of the program for the 1994-95 school year.

The board has already confirmed funding for the second phase of the

program which will bring another twenty-two teachers into C.A.T.T. The teachers who are involved in the project this year will act as facilitators for the teachers who take part in the second phase. The laptops used this year will be passed on to the new group and the teachers from the 1993-94 program will be given desktop computers for their classrooms so they can continue using their newly-acquired skills and share them with their students.

The program was sparked by concerns that student performance in the Exploits Valley school district has been steadily declining. These conclusions were based on classroom observations, ongoing formative evaluation, national indicators like the C.T.B.S. scores, provincial criterion-referenced tests, and public examinations. Educators in the area believe that if this downward spiral is to be reversed, the professional development of teachers in the district must become a priority. Traditional meth-

ods, such as the one day workshop, are not adequate. They believe that professional development should be sustained, ongoing and intensive, and include the most current technologies. C.A.T.T. is the result of one of their efforts to address this concern.

Deborah Armstrong, the Special Services Coordinator; Ruth Davis, the Primary Coordinator; and Gary Young, the French Coordinator, conceived the idea and developed the project. Forty-nine primary and elementary school teachers applied to the program and twenty-two were accepted from eleven different schools. From the beginning the facilitators stipulated that a strong commitment from the teachers would be required. Very few of the teachers had previous experience with computer technology but received hands-on computer training as the program progressed.

The initial training session in September took the form of a five day workshop. Emphasis was placed on

group dynamics and cooperative learning throughout the in-service. The basic computer skills covered during these sessions included file management, keyboarding, and communications. The teachers were also given an opportunity to develop a proficiency with an integrated software package, Clarisworks. It is stressed, however, that the purpose of the project was not only to teach computer skills but to facilitate a routine of ongoing professional development through the use of computer technology.



Joan Clarke and Bill Melvin work on a software tutorial.

The participants also attend weekly sessions at the board office. They meet each Tuesday at 5:00 p.m., share a meal, and at 5:30 p.m. begin the session. Teachers have made a commitment to attend and Gary Young claims that it is very unusual for anyone in the group to miss a session. The three coordinators plan the meetings carefully. An agenda is created, activities are planned, and journal articles are selected for the group to read and discuss. The first order of business is to discuss any problems or questions members of the group may have with regards to work from the

previous meeting. The teachers are then given articles, software tutorials or communications assignments that help them work with various aspects of technology. For homework they may be asked to send email to their partners, access the Internet to find information specific to their curriculum area or evaluate a piece of software. The exercises are designed to assist them to work with the technology that will be used as professional development tools.

The main purpose of the project is to encourage teachers to focus on a sustained approach to professional development. To facilitate this process, articles are chosen for reading and group discussion. At the April 12th meeting journal articles on the theme *Teaching for Understanding* were discussed. The participants were divided into five groups. Each group evaluated one article on this theme and reported to the larger group. Ruth Davis noted that the group has become very discerning with journal articles. "Our approach to the articles has changed greatly since the first meeting. The group members are very straightforward in their criticism. They will certainly tell you what they think."

The activities' section of the meetings generally involves some aspect of technology and how it can be applied to education. These activities can include an introduction to a piece of software, a cooperative learning approach to a program tutorial, or an introduction to a new area of the Internet via STEM~Net. Members of the group often request activities in areas of particular interest to them. Together, either in the meetings or during the rest of the week via email, the participants work through any difficulties they may encounter with the technology.

A question period follows the activities' section of the meeting. Participants ask questions about the

technology they are using, make suggestions for the agenda of future meetings, or discuss issues pertaining to professional development. The meeting concludes with a check of members' progress. The participants express their views about their own progress at the meeting and offer some self-evaluation in terms of their improvement and increased level of understanding of technology.

Board, is dealing with requests from several schools. "A number of schools in our district want to start their own program. Some have assured 100 per cent participation from the staff and have indicated that they are more than willing to put their own time into the project."

The main benefit of the program is undoubtedly the attitudes it has generated in the participants. In a mid-project evaluation one group member wrote, "C.A.T.T. has renewed my faith in the teaching profession. It has been inspiring to see busy people work so hard and so faithfully." Another member of the group commented, "The greatest benefit coming from this project is the realization that long after it has ended, this network of educators will still be talking, assisted by the computer." Deborah Armstrong attributes these positive results to a straightforward approach. "This is not a computer course where we teach technology for technology's sake. This project is about professional development. Computers are just a tool we use to help us get where we want to go." Apple Computers has taken an interest in the program and will be highlighting the project with a Hypercard presentation and Quick-time video on a CD ROM called, *Apple Innovators in Education*, available in May. Ω

"This project is about professional development. Computers are just a tool we use to help us get where we want to go."

The school board personnel who facilitate the program use several criteria to evaluate it. They have observed a marked difference in attitudes among the participants with regards to professional literature and the potential of the computer as a tool for professional development. The most significant indicator, however, is the time these teachers spend on-line. They are using email extensively to discuss curriculum issues and journal articles, share teaching strategies and classroom materials, or discuss issues specific to the project. Another indicator of the project's success is the number of teachers in the district who want to start programs of their own. Stan Cole, the superintendent of the Exploits Valley Integrated School

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an innovative computer project at the intermediate level

Sound planning, cooperation and enthusiastic leadership are all ingredients in the success educators enjoy with the computer project at G.C. Rowe Junior High School. Because of the diligent efforts of the school's Computers in Education Committee and Academy Canada, a privately owned post-secondary institution in Corner Brook, the students at that city's largest junior high now enjoy the use of a sophisticated computer network.

Interest in the project was first generated in the fall of 1992. Gary Perry (the principal of G.C. Rowe) and many of his staff were eager to establish a program to help their students become computer literate. A number of teachers at the school were well aware of the benefits that their students could derive from exposure to the technology. Consequently, they established a planning committee and

went to work. School boards, government, and special interest groups from the private sector all confirmed that well-planned and intensive implementation of computer skills education should take place at the junior high level. There was a great deal of literature to support the staff's intentions.

However, the planning committee had to deal with a number of difficulties. The question of financing was always a concern, but no issue was more pressing than how to implement a program of computer literacy into a curriculum that already challenges the time restraints of the school year. Recent attempts to introduce computer education at the elementary and junior high levels met with limited success because computer education was seen as an add-on to the curriculum. Therefore, they felt that computer education had to be linked to some

area of the core curriculum. Their first step in solving this problem was to decide exactly what they wanted their students to learn from exposure to computers. They determined that the students should first be taught keyboarding and word-processing, and that the Language Arts program at grades seven, eight, and nine be modified to accommodate the teaching of these skills. The committee recommended that for the 1993/94 school year keyboarding and word-processing be introduced at the grade seven level and continue into the grades eight and nine programs in subsequent years. Teaching these skills to grades eight and nine students during the 1993/94 school year would be optional. A skills continuum for word-processing was then developed for grade seven.

The committee was also eager to identify other curriculum areas where learning would be enhanced through the utilization of microcomputer and related technologies. They felt that the use of tutorial software, which creatively employs graphics, sound, and simulation, would be useful in promoting the acquisition of facts, skills, and conceptual understanding in the science program. Mathematics teachers would enhance their program by using Computer Assisted Instruction (C.A.I.) software packages that are compatible with the present curriculum. Social Studies teachers would be able to take advantage of existing databases such as P.C. Globe and online databases through services provided by the ACCA Enterprise Network, Statscan, and the Internet. CD ROM technology would also provide electronic access to information that is presented in an attractive and motivating format. Database software would be used to compile, organize and display information and the word processing applications would be used to develop papers and reports in all

subject areas. Computer assisted instruction in many subject areas would be utilized to aid students with learning difficulties and would facilitate the individualization of instruction for all students.

Having decided what they wanted to accomplish with the technology, the next step for the committee was to determine what type of hardware and software they would want to use and how this equipment would be deployed. They decided to use IBM compatible computers with the MS-DOS environment. As recommended by the committee, a computer lab was established consisting of 28 workstations and one file server. The lab is equipped with sufficient machines to provide a one-to-one student/computer ratio for class instruction. Fifteen more workstations were placed in the learning resources centre. Novel network software is being used and the IBM Classroom LAN Administration System (ICLAS) software is being utilized to control the various levels of access to the network. WordPerfect 6.0 is the word-processing package in use.

Next, the committee approached the entire staff of the school to reach a consensus on the strategies for the implementation of the project. Then, in cooperation with Academy Canada, a program was scheduled to provide training to teachers in keyboarding and word-processing. Classes were held at Academy Canada and run by Academy Canada staff one night per week, two hours per night, over an eight week period from April 26 to June 18, 1993. Attendance was voluntary and the vast majority of the staff took advantage of the sessions. In late August, the computer committee members met with the system installers to familiarize themselves with the network and to sort out technical issues pertaining to the system. Again, teachers attended the sessions

voluntarily. These individuals acted as facilitators for other staff members at an inservice held for the entire staff in September. At this two day workshop, teachers at G.C. Rowe explored models of instruction for teaching keyboarding and word-processing, engaged in practice teaching sessions,

Word Processing Skills Continuum

Grade Seven

Starting Out

Logging On
Entering Text
Inserting Text
Deleting Text
Using Menu Bar
Bolding Text
Underlining Text
Saving Text

Editing Text

Open a saved Document
Scroll Through a Document
Selecting a Block of Text
Deleting a Block of Text
Moving a Block of Text

Formatting Text

Adjusting the Text Size
Centering Text
Tabbing
Indenting Sentences
Indenting Paragraphs
Adjusting Line Spacing
Changing Margins

Finishing Up

Searching for and Replacing Words
Checking for Correct Spelling
Printing A Document



Ed Payne works with a student in the computer lab.

evaluated teacher competencies with respect to implementation of micro-computers across all curriculum areas, and developed a plan for teacher training in microcomputers through the fall and winter of 1993/94.

Students have been using the computer lab at G.C. Rowe since September of this school year and the teachers and administration of the school are very pleased with the project. Ed Payne, the system administrator, has spent a great deal of his own time installing and working with the new system. Payne has been teaching for more than 20 years and describes his work in the computer lab as a new and very enjoyable challenge. As well as technical expertise, Payne also provides professional support and team teaches in the lab with other staff members. Les Butler, the learning resource facilitator at G.C. Rowe, says that the grade seven students are becoming quite proficient in keyboarding and word-processing. He also finds that students have a greater tendency and desire to share their work and are proud of what they are accomplishing. He is also looking forward to the completion of the learning resources centre automation project. This will enable students to access the library card catalog through the network and also give them access to information on networked CD ROM software.

John Oldford, a grade seven language arts teacher at the school, is encouraged to find that students are beginning to do all of their writing on the computers. His students no longer produce a rough draft with pen and paper. They go straight to the keyboard with their research notes and write. He notes that this process encourages his students to be more thorough with the editing process.

The success that the staff of G.C. Rowe Junior High School has enjoyed with this computer project is the

result of much planning, cooperation and enlightened leadership. Gary Perry is very positive about the program and says that it works because the staff members of his school want to make it a success. He is greatly appreciative of the efforts of Ed Payne and stresses that if projects like this are going to be successful, at least one teacher on staff must have the expertise and the desire to spend the time to learn the system and to act as the system administrator. Perry is also very pleased with the capacity building that has occurred. As the staff members become better acquainted with the technology, they are better able to apply it to their subject area.

Now that the first phase of the project is well underway, the staff of G.C. Rowe is involved in the planning process once again. The goal is to make use of the new computer facilities as much as possible in other curriculum areas. The staff intends to introduce more productivity software in the form of database and spreadsheet applications. Careful planning has been the hallmark of this project and is a key factor in allowing the educators of G.C. Rowe Junior High School to fulfill their commitment to help their students become lifelong learners. Ω

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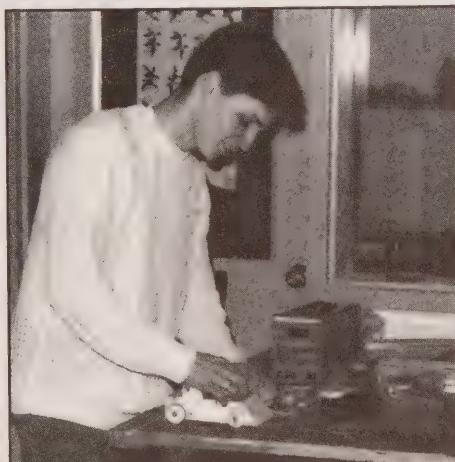
Modelling Engineering and Applied Sciences for Students

Women in Science and Engineering Incorporated (WISE)/Femmes en Sciences et en Genie (FSG) is a national, non-profit, service organization that was founded in 1977. It was established to promote awareness in women of careers in science and engineering and to encourage them to pursue professions in these fields. The association also acts as an information centre for and about Canadian women in these fields and provides a forum for discussion on subjects of interest to its members. A recent initiative sponsored by the Newfoundland and Labrador chapter of WISE is intended to heighten the awareness of all of the province's students in the areas of engineering and other applied sciences.

Members of this organization are working to place interactive engineering models, in kit form, in the province's intermediate and senior high schools. The program is currently in the first phase of operation. Prototypes of three kits are being designed and built at the Marine Institute in St. John's. Once these prototypes are completed, five multiples of each prototype will be constructed. The five production models will be placed in schools around the province for piloting from September 1994 to January 1995. After completing an evaluation, WISE will approach various industries and orga-

nizations to provide funding for further kit multiples. To date, the prototype of the first kit is nearing completion and the designs for the second are well underway.

The first prototype is designed to provide students with an opportunity to explore aspects of electrical engineering. The Electrical Motors Race Experiment consists of the components required to construct an electric motor which drives a model car. The kit provides students with materials to build a motor in a number of configurations so they can experiment with different balances of power, performance and cost in two different applications. Abigail Steel, the project engineer, expects the kits will play slightly different roles at the intermediate and senior high levels. "In intermediate school students will build the models and try to make them work



Thomas Silver working on the Electrical Motors Race Experiment Prototype

efficiently. At the senior high level we want the students to work with some of the calculations and try to concentrate on a balance between performance and cost."

Thomas Silver, a student of Industrial Engineering Technology at the Marine Institute, is fabricating the prototypes as a work term project. Silver has been working with the electrical prototype since the design stages. In order to provide students with options in motor configuration, material that is not commonly used in electric motor production was employed. Silver notes, "A lot of people who deal with this type of technology told me that we wouldn't get the motor to work unless we used metal for the motor housing and the armature core." Steel and Silver persisted and did create a configuration that utilized plastic for both parts. Silver points out that the materials used in these parts create a significant difference in motor performance but students will have to use discovery learning methods to find out which design is most efficient for particular applications.

Work on the second prototype is underway. A Perpetual Motion Mechanism Experiment will let students explore concepts in mechanical engineering. There are two possibilities being considered for the third prototype, one dealing with the fundamentals of environmental and geological engineering, and the other dealing with manufacturing and industrial engineering practices. Work on the project is on schedule and Steel is planning to have kits ready to pilot in September. Ω

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L'enseignement à distance

pour les francophones de la Péninsule de Port au Port

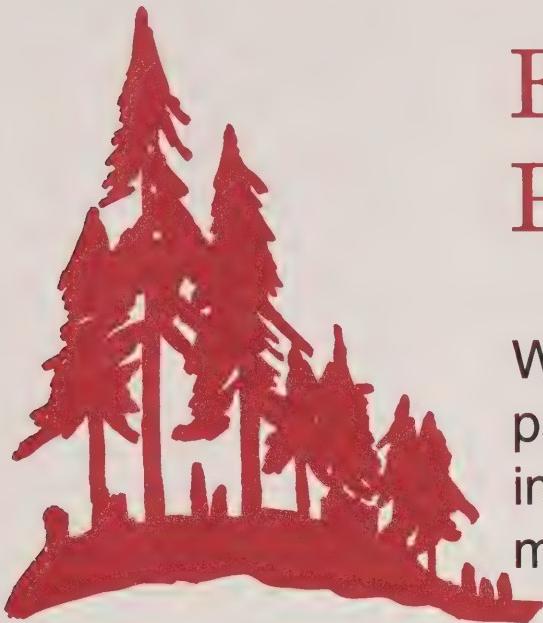
En 1993, la Fédération des francophones de Terre-Neuve et du Labrador a initié un projet d'enseignement à distance afin de permettre aux francophones de la Péninsule de Port au Port d'avoir accès à de la formation en français. Les gens des communautés, surtout ceux intéressés au développement économique de leur région, ont besoin de cours et de programmes en français pour approfondir leurs compétences et connaissances dans cette langue. L'état déplorable de l'économie, les coûts élevés reliés aux cours tels que le déplacement, l'hébergement et les inscriptions sont des obstacles majeurs pour ceux qui veulent s'éduquer davantage. La technologie de l'enseignement à distance par téléconférence est un moyen de surmonter ces obstacles.

La formation à distance offerte par TETRA (Telemedicine and Educational Technology Resources Agency) permet aux étudiants d'augmenter leurs compétences et les aident à se préparer pour le marché du travail. Ils peuvent également avoir accès à des cours en entrepreneurship, en hospitalité, en développement économique et profiter du programme d'alphabétisation en français présente-

ment offert par la Fédération.

Grâce à ce projet, deux sites de téléconférence sont installés dans les communautés francophones de La Grand'Terre et de l'Anse-à-Canards. (Un était déjà installé à Cap St-Georges par la Commission scolaire Appalache.) Le but principal est de former des formateurs qui pourront éventuellement diffuser le programme ALPHA (alphabétisation en français) à la population francophone de la Péninsule à partir d'un point central. En plus, le système permet aux francophones de la région de Port au Port d'avoir accès à une variété de cours et de sessions de formation provenant de différentes institutions d'enseignement françaises à travers le pays. Le système de téléconférence est aussi disponible pour les autres groupes et organismes de la région tels que les écoles, les associations touristique et économique, les groupes de jeunes et de femmes et les conseils communautaires. Ω

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Forging New Partnerships

Westviking College and two pulp and paper mills are working together to improve human resource development in the paper-making industry.

On the province's west coast, an innovative partnership has begun between Westviking College and two pulp and paper companies, Abitibi-Price and Corner Brook Pulp and Paper Limited. The project involves personnel exchange between the college and the industry. College instructors will conduct an assessment of training needs at each mill site and in turn each company will provide professional services to the College through direct instruction, program advice and consultations regarding the potential of sharing equipment.

Specifically, a curriculum consultant is assigned to each company for a six-week period. The consultant's tasks include a review of existing skill levels in the various departments and the identification of projected skill requirements. The company is then given the option of arranging training sessions to address any deficiencies. Projected skill requirements are incorporated into training programs. Professional staff from the various mill departments of both companies will work with instructors in the delivery of industry-related college programs at

the Corner Brook Campus and the Bay St. George Campus.

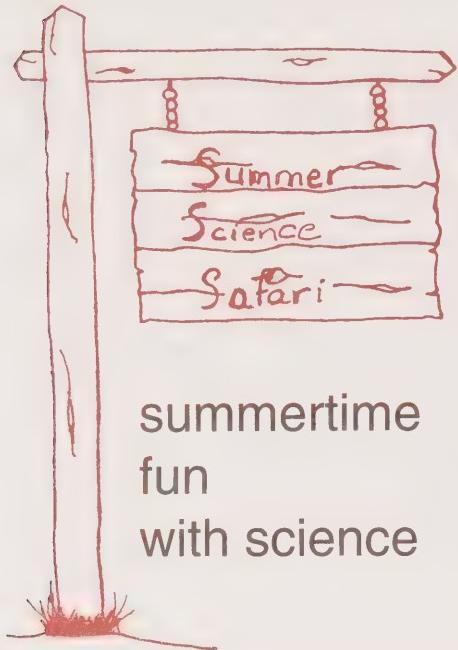
This exchange of expertise will benefit both parties. Personnel from Westviking College will become more familiar with the operations of a modern pulp and paper mill and refine the college's programs accordingly. At the same time, the two pulp and paper companies will benefit from an analysis of their current and projected skills requirements and will have input into the programs offered by the college.

A Westviking College curriculum committee is actively working on a pulp and paper program. Representatives from the college and the two pulp and paper companies sit on the committee. Cyril Organ, the Program Development Officer at Westviking College, is encouraged by the results of this cooperative effort. "We want to establish a menu of specialized courses for the pulp and paper industry. These courses will not only be in place to train potential workers for the industry but will also serve to upgrade the skills of the individuals already employed." Organ is hopeful that this exchange program will be the model for future relationships between indus-

try and the province's colleges.

Those involved in the pulp and paper industry realize that the fierce competitiveness of the marketplace requires that companies look to a highly skilled workforce to ensure their future. This personnel exchange is one initiative which will help fulfil that goal. Westviking College in its commitment to the economic development of Newfoundland and Labrador is ensuring that the companies can avail of quality programming for their employees. At the same time the companies have access to the highly skilled individuals whom they require in order to be competitive. **Ω**

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The need for innovative approaches to science education has long been recognized as crucial in attracting young people to the various fields of science. For several years, the Division of Continuing Studies at Memorial University, Personal and Professional Development Unit, has been involved in a number of initiatives to promote interest in science among young people. Summer science camps in St. John's attracted nearly full enrolment and resulted in very positive learning experiences.

To accommodate young people who do not live in close proximity to St. John's, the Division of Continuing Studies proposed a Traveling Summer Science Safari. The primary goal of Summer Safari '93 was to encourage increased participation of young people in rural Newfoundland in science and mathematics. Beth Power was hired to coordinate the summer science program. By early June, eight sites were selected and promotional literature was distributed to the province's schools. The sites selected were Bonavista, Harbour Grace,

Glovertown, Carmanville, Harbour Breton, Baie Verte, Port au Port and Port-aux-Basques. A total of 137 participants ranging in age from eight to eleven years registered for the program. The interactive program for the project was developed by instructors Beth Power and Renee Pearce. The program emphasized the discovery approach to science and encompassed many areas of scientific study including biology, astronomy, chemistry, environmental science, and physics. Weekly speakers provided informative and entertaining presentations and offered students the opportunity to learn more about careers in science. For example, Peter Demo, a guest speaker representing Rambler Mines in Baie Verte, took the students on a gold panning expedition. Rosie Seton, a graduate student involved in whale research, was a guest speaker at the Bonavista camp. She brought the skeleton of Humpty, a humpback whale, for the children to assemble. Friday afternoons were set aside for magic shows and plays as a chance for students to display their talents and newly-acquired skills.

The young participants became involved in a variety of science-related activities. Students cited growing

crystals, tie-dying shirts, experimenting with an oil-spill, going on a treasure hunt and other field trips as the most memorable events. Evaluation procedures elicited many positive comments from the students. Their responses included: "This is a lot better than sports camps" and "I didn't know science could be fun." Parents who attended the closing events were unanimous in their praise of the program.

Instructors Beth Power and Renee Pearce noted that enthusiasm for the project and a genuine interest in science are essential qualities for both instructors and contact persons. Sufficient time must be allotted for promotion and site selection to ensure maximum participation and an effective program. Ω

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Campers pan for gold

Problem solving is a creative process that requires original thinking. The teaching of mathematical problem solving skills, therefore, is a challenge. Indicators of student achievement in mathematics in Newfoundland and Labrador schools has shown a particular weakness in problem solving skills. Two initiatives are currently underway to address this problem. One has its roots at Grenfell College in Corner Brook and the other originates with the Department of Education.

In contrast to the formal, strategy-oriented process traditionally used, a new program emphasizes a playful, cooperative approach to learning mathematics. The project was undertaken by Dr. Georg Gunther, Department of Mathematics, Sir Wilfred Grenfell College, Dr. Jim Duffy, Department of Psychology, Sir Wilfred Grenfell College, and Lloyd Walters, Mathematics Coordinator, Western Integrated School Board. The first component consists of a study to compare current methods of teaching mathematics to the method pioneered by Dr. Georg Gunther. The innovative aspect of the Gunther method is the emphasis that it places on creating a real interest in mathematics as well as teaching mathematical skills. The new method is designed to increase the students' motivation to achieve in mathematics.

After completing extensive research into the factors which affect mathematical performance, the individuals involved concluded that an intervention program which focuses on an improved method of teaching mathematics would have a reasonable chance of improving children's mathematical skills. Their research also indicated that a gender-based advantage in mathematics favouring males continues to exist.

The initial component of this project focuses on a comparison of the

Working with Problem Solving

two new initiatives exploring ways to motivate students

Gunther method and the current classroom method used with grade seven students. During the summer of 1993, the curriculum materials were developed for use in a games-based approach to learning mathematical problem solving skills. Eighteen games and hundreds of mathematical problems to accompany the games were developed. The problems were scrutinized for their suitability for grade seven students.

At the beginning of this school year, the new approach was introduced to principals and teachers in the Western Integrated School Board district and received a positive response. The method was then introduced into a total of four classes in two schools, G.A. Mercer and Templeton Collegiate. The current approach to teaching problem solving

was used as a comparison in the same number of classes in the same two schools. All students completed the Fennema-Sherman Mathematics Attitudes Scales and mathematical subtests of the Canadian Test of Basic Skills before beginning the new program.

Currently, in any given class, one period per six-day cycle is devoted to teaching mathematical problem solving for the entire school year. The Gunther method of mathematics instruction is a play-based program that attempts to foster an intrinsic motivation to do mathematics. Each class session consists of a mathematical game and a brief discussion of the particular types of problems encountered in that game. Some examples are: Math Market, Math Mystery, Evolution, Fish 'n Chips, Planetary

This method is the first of its type to be implemented anywhere in the world.

Voyage, and Speed Sprints. For each game, the students are divided into teams, with each team competing to find a novel solution to a problem. Each team consists of three students of varying levels of mathematics proficiency. Cooperation within the group is an important component that is stressed by the teacher. The entire class is challenged to compete against a fictitious group. Teams are encouraged to help each other by experimenting with different approaches.

The games are also intended to motivate students by appealing to their imagination. For example, in Math Mystery, each team is presented with a situation describing how rabbits were stolen and how the police were unsuccessful in apprehending the culprits. However, the police have collected three clues as to the robbers' hide-away. Students can buy the clues by solving crime-related mathematics problems. The students' mission is to discover the hide-away, the number of thieves involved and how many rabbits were stolen.

The use of games creates an atmosphere which encourages cooperation and group cohesion within competition. The learning of mathematical problem solving is incidental rather than intentional. The program has been in the pilot phase since September of 1993. Gunther's team is preparing to evaluate empirical data that they will collect in early May of 1994. Data to date consists of observa-

tional information. Lloyd Walters notes that the impressions of the program have been positive. "Students are more tenacious when they are working on a problem. They will work with a problem until they understand it instead of just knowing how to do it." Walters also notes that extensive research in problem-solving strategies undertaken by the team indicates that this method is the first of its type to be implemented anywhere in the world.

The program leaders sponsored a competition in Corner Brook from April 28th to April 30th. Students from 38 intermediate schools from Newfoundland and Labrador participated in a team event using the games that were created for the program. Fifty teachers, three from each school board, were also present to observe the event and then participated in a workshop designed to help them implement the approach in their own school districts. Representatives from Nova Scotia also attended the event. They are considering the new method for implementation in that province's schools.

Another initiative which intends to further address this weakness in the province's schools will provide resource materials at the primary, elementary, intermediate, and senior high levels beginning in the fall of 1994. The intention is to provide one resource kit on mathematics problem solving to every teacher in grades one

to eight. Resources will be provided on a per level basis in intermediate and senior high schools. Additional resources on cooperative problem solving, challenging mathematical problem solving for gifted students and problem solving used in mathematical competitions will also be made available.

The resources, which will be presented in printed form, have been identified as good material by consultants, coordinators and teachers from around the province. Pat Maxwell, a mathematics consultant with the Department of Education, is confident that this approach will help address the weaknesses that exist in problem solving. "We want to give teachers adequate tools to achieve the objectives set out in the curriculum." Ω

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Encouraging Excellence in Mathematics and Science Education at Memorial University

In order to encourage mathematics and science students to enter the teaching profession, the Faculty of Education at Memorial University is offering scholarships to students who are concentrating their studies in these areas. Students enrolled in either undergraduate or graduate programs are eligible. They must be registered in full-time study in the Faculty of Education. Students enrolled in a B.Ed. (Primary) or B.Ed. (Elementary) program must have successfully completed not fewer than three courses either in Mathematics or in a Science. Students enrolled in a B.Ed. (Secondary) must have successfully completed not fewer than eight courses either in Mathematics or in a Science. Graduate students who are eligible must be enrolled full-time in programs with concentrations in Mathematics or a Science. Students

must have completed successfully not fewer than sixteen university courses with an overall average of not less than 75%.

The maximum value of the scholarships will be \$2,000.00 per semester and can be held for a period of three years. Students who receive them must maintain their academic standing and must continue with a concentration in either Mathematics or a Science throughout the duration of their program.

Seven students from various programs within the Education Faculty received scholarships from the bursary program in a ceremony held on Thursday, April 7, 1994. Dr. Frank Riggs, Associate Dean of Graduate Programs in the Faculty of Education made brief remarks to the gathering. He commented that the recipients "are the best of a very good lot of applicants." Ω

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Standing L-R: Cindy Dale, Lisa Jenkins, Trudy Evoy, Lorina Spurrell
Seated L-R: Sharon Druken, Trina Humber, Edith Lynch,

ZON COOPERATION

The Cooperation Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the need of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvements efforts, support community education and reward high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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The Path to a Lifelong Learning Culture

Learning is a continuous process. Throughout our lives we sense our surroundings, adapt to the needs of the moment and learn from the experiences gained from interacting with our environment. The history of Newfoundland and Labrador is rich with examples of how people and communities flourished because they were able to meet challenges and regain control of their circumstances. Newfoundlanders and Labradorians are again being challenged to find a place in a dynamic world economy. If our province is to meet this challenge, we must be encouraged to become active lifelong learners.

Building a lifelong learning culture is a goal of human resource development and benefits the individual, our communities and the province in a number of different ways. First, it encourages greater community involvement in education. This involvement fosters productive partnerships, teaches us to make better use of our resources, and develops a spirit of cooperation. Business, labour, government and community groups are working together to enhance educational opportunities for our children and we are learning again that "it takes a whole village to raise a child."

Secondly, a culture steeped in learning produces a more knowledge-

able and highly skilled workforce, better able to keep up with fast-paced technological change. Business and labour are working diligently to upgrade skills, and develop unique solutions to business challenges.

Building a lifelong learning culture is beneficial to the individual. It opens greater possibilities, encourages us to ask questions, consider new options and offer new solutions. Learning becomes a multifaceted endeavour where employer and employee, parent and child, teacher and student learn together in an open dialogue. The forming of partnerships helps people to realize and respect the talents of others, and in turn gain new respect for their own abilities.

This issue of Prospects explores this topic by presenting some of the initiatives that are being undertaken by the Agreement and other institutions, organizations and businesses to foster lifelong learning. We have taken different perspectives and have tried to achieve a balance. You will read about programs which are targeted at people of all ages, from a project that encourages preschool and primary school children to learn about our marine environment to programs designed by businesses to encourage their employees to upgrade their skills and a program that encourages older

adults to continue their learning.

All of the articles presented in the premiere issue of the journal were profiles of projects funded by the Canada/Newfoundland Cooperation Agreement on Human Resource Development. The articles in this issue and in the issues that will follow will be divided into two categories. Items designated as Feature Articles will deal with programs outside the Agreement. Articles written about projects funded by the Agreement will be designated as Project Profiles. We have written two feature articles for this issue, one on the Elderhostel program and another on human resource development in three Newfoundland businesses.

Cultivating a lifelong learning culture will result in a more positive attitude towards ourselves and our province. It will help us to find the focus and balance we need to energize our economy.

Trudi Johnson
Albert Johnson
(editors)



Fisheries Education for Small Fry

teaching primary and preschool children about the marine environment



*Oh, the wind blows over the land
And the sea rolls over the sand
Come play with me,
We'll see creatures at home in the sea.*

Inspiring children's interest in the marine environment is the primary objective of a project designed by the Atlantic Centre for the Environment in St. John's. This learning program which has the working title, "Fisheries Education for Small Fry", targets science education in primary schools and preschools throughout the province. It focuses on improving young children's knowledge of and appreciation for the ecology of the ocean environment.

The project includes the development, publication and evaluation of a children's book published by Breakwater Books in St. John's. In addition, an audio-cassette of songs and a story suitable for preschool and primary children ages four to eight is being produced. The story book is being written by Heather Griffin while accompanying songs are being

produced by children's songwriter, Eric West. Full colour illustrations for the story will be developed by a Newfoundland artist.

The book takes the point of view of a child in presenting the basic "story of the ocean". Through songs, illustrations and words, it explores the diversity and the interconnections of life in the sea. For example, a chorus in one of Eric West's songs to be incorporated into the story invites children to learn more about marine life.

Equally important, the story addresses the significant role of science in understanding and managing the resources of the sea, while at the same time encouraging caution in our approach to resource management. The book's educational potential will be enhanced by the development of a guide for teachers, parents, childcare workers and other adult facilitators. It will offer activities, questions for discussion, song lyrics and other means of emphasizing the main concepts in an unintimidating fashion. The audio-

cassette enables the child to experience a self-guided voyage through the story by providing a complete reading of the text as well as recordings of the songs.

The program was initiated by Heather Griffin who has also co-authored a textbook entitled, *Finding the Balance: For Earth's Sake*, for the new Environmental Science program in the province's high schools. While working on that project, she identified a gap in science education at the preschool and primary levels. She saw that particular age group as "a generation at risk" in terms of their understanding of the marine environment and the importance of developing a sense of hope for their future relationship with the sea. In designing the materials, Griffin received the cooperation of parents of fishing families, personnel of the provincial Department of Education, primary school educators and the Department of Fisheries and Oceans.

During the spring and summer of 1994, the project was in the initial stages of developing a story line, drafting a text, and writing lyrics for accompanying songs. Griffin hopes that the project will be ready for piloting in selected schools throughout Newfoundland and Labrador by late fall with completion targeted for late spring of 1995. Financial support will make the program available at a subsidized cost and will also assist with the marketing, distribution and evaluation of the curriculum. Griffin and West also intend to market the product in the rest of Atlantic Canada and the New England states.

The Atlantic Centre for the Environment is a private, non-profit environmental awareness organization incorporated in Canada and the United States. The organization conducts programs in conservation and leadership development through education and training research, informa-

tion, technical assistance and policy development. The Centre works primarily in rural areas throughout eastern Canada and northern New England. The field office in St. John's, directed by Heather Griffin, coordinates these activities for the province of Newfoundland and Labrador.

By providing young children throughout Newfoundland and Labrador with a basic ecological understanding of the ocean environment, this project helps to define our relationship with the sea, past, present and future. In that sense, it also provides a teaching tool for parents, teachers, youth leaders and scientists for explaining to children some of the reasons for the decline of the fisheries and the effects that decline is having on their families and communities. It is hoped that the program will stimulate questions and learning in the minds of both adults and children. Ω

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Atlantic Centre for the Environment
Department of Fisheries and Oceans
Department of Education
Fortis Education Foundation
Breakwater Books
COOPERATION Agreement on
Human Resource Development

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Eric West and Heather Griffin

The title graphic is kindly provided by the communications branch of the Department of Fisheries and Oceans.

Learning Together: Family, School and Community

three projects are building bridges in education

New emphasis is being placed on the community's role in education. Partnerships between parents, community groups and the schools are being formed to encourage improvement in student achievement. Three projects fostering these partnerships are "Volunteer Tutoring and Homework Supervision", "Parents Participating: Children Achieving" and "A District Computer Training Program."

The volunteer tutoring services and homework supervision project is focusing the community's efforts on the idea that the education of children is a shared responsibility of school and community. In 1993, a committee coordinated by the Volunteer Centre of the Community Services Council in St. John's identified the need to offer tutoring to school children, particularly at the primary and elementary school levels.

The opportunities that families have to work with schools in the education of their children vary considerably. In recent years, several community agencies have moved towards offering educational support programs. The task of the Volunteer Centre is to

help various agencies address these educational needs without placing extra demands on already over-extended budgets. Instead, current facilities could be utilized and volunteers recruited and trained to provide tutoring and supervision.

This marked the beginning of "homework havens", facilities provided by community groups around the city to be used as a drop-in area for primary and elementary school children after school. In a quiet, supervised environment, students can complete homework and other assignments. The committee plans to establish at least seven or eight of these "havens" during the present school year. In the St. John's area, "homework havens" can be found in such places as the "Hope Foundation for Youth", YMCA, Boys' and Girls' Clubs, the public libraries, and community centres. Facilities vary according to space and resources available as well as demand from neighbourhood school children. Each agency sets its own days and hours within the limits of after school, early evenings and weekends.

The Volunteer Centre of the

Community Services Council acts as the coordinator to provide these services. Staff members who have a background in literacy education are helping organizations interested in establishing homework havens throughout the region. The Centre also helps schools and community agencies deal with issues involved in volunteer recruitment, including screening, insurance concerns, and assessing volunteers' potential.

Personnel at the Centre establish models that are financially feasible for the community agencies. Some community agencies offer funded tutoring programs. Specially-trained adults are available, for example, in the Froude Avenue Community Centre, to tutor children with their homework on a one-to-one basis.

Volunteers involved in tutoring and homework supervision for primary and elementary school children are high school students, university and college students and others who share an interest in working with children either as a career or as a pastime. The approach brings together in a unique partnership community organizations such as Teachers-on-Wheels, which provides training for tutors, the public library system which offers both facilities and resources, and R.E.A.D. Canada which supplies books to the centres.

"Parents Participating: Children Achieving" is a project in progress at St. Pius X elementary school in St. John's. It is designed to encourage parental involvement in the learning culture of the school community. It focuses specifically on providing parents with access to computer technology and training. A ten-hour computer training program is being offered to parents of children who attend the school. They receive training on how to operate a computer and troubleshoot minor problems that arise in the course of computer-aided instruction.

Parents are also given specific training in the use of software packages used by schools, taught to access information by means of a modem, and to field-test software with their children. Basic training in small group instruction is part of the program. This will ensure that good educational practices are followed in the computer laboratory, making the instruction consistent with existing classroom standards.

At present, 40 parent volunteers, trained by other parents and teachers, are supervising computer laboratories during school hours. As a result of this program, teachers can assign curriculum-related work to be completed outside the classroom. The types of learning made possible by this method include mathematical problem-solving activities, word processing, and simulations in environmental studies.

Ron Pellerin, principal of St. Pius X elementary, is pleased with the level of support he is receiving from parents. "Parents are finding their specific place in school and are more understanding of the complexity of the school day." Funding for this project provides parents with access to resources via computer networks and

databases to build their knowledge about education. The opportunity to communicate in electronic forums with parents and children elsewhere can increase the chances of effective parental involvement in school life and enhance lifelong learning at all levels.

"A District Computer Training Program" is part of the long-term strategic educational plan of the Conception Bay South Integrated School Board. The project enables teachers to learn more about the use of computers in instruction and become more comfortable using new technology. The training is provided by program coordinators René Wicks and Monty Pritchett who have developed training modules around highly-rated software packages. Wicks emphasizes the importance of software meeting curriculum objectives. The two coordinators have developed manuals to show how various software packages can be incorporated into lesson plans. For example, PC Globe may be used for studying countries in social studies at the intermediate school level. The Children's Publishing Centre is popular in



Parent volunteers working with students in the St. Pius X elementary school computer lab

The coordinators plan to offer a summer institute in 1995 which will give teachers, parents and children an opportunity to learn computer applications together.

primary and elementary schools. CD Rom technology gives high school students computer access to resources such as TIME magazine. During full-day sessions and grade level workshops, teachers are given the opportunity to use various types of software to support the curriculum. They are also shown how to access STEM- Net and the Internet. An ongoing evaluation of the program is conducted through observation and feedback from the participants.

This project, which is continuing until 1996, promotes the use of computers in resource-based learning. This type of learning is an integral part of the curriculum and instructional process in the schools. The goal is to make maximum use of computers as an instructional tool. In the future short courses will be provided in the evenings and on weekends for teachers and parents. The coordinators plan to offer a summer institute in 1995 which will give teachers, parents and children an opportunity to learn computer applications together. The incorporation of computer technology will be more effective as district teachers achieve computer literacy and confidence in using the technology in the classroom. Ω

Project Partners: Parents

Participating: Children Achieving St. Pius X elementary school Roman Catholic School Board for St. John's
COOPERATION Agreement on Human Resource Development

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Adhoc Committee on Volunteer Tutoring, Volunteer Centre

R.E.A.D. Canada

Teachers-on-Wheels

St. John's Public Library system

Newfoundland Home and School Federation

YMCA/YWCA

Big Brothers/Big Sisters

Froude Avenue Community Centre

Faculty of Education, Memorial University

Department of Social Services

Hope Foundation for Youth

Skills for Success

Avalon Consolidated School Board

Roman Catholic School Board for St. John's

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PARTNERS IN EDUCATION

WORKING & GROWING TOGETHER



The belief that "it takes a whole village to raise a child" is the inspiration for new programs involving educational partnerships. Rethinking attitudes towards learning and bridging the gaps between education and the workplace are crucial if students are to accept that learning has relevance to their future.

A project involving school boards in the St. John's region was initiated in January 1994. It focuses on the implementation of cooperative education, career education and other educational partnerships for the purpose of fostering a more equitable sharing of the responsibility for education and school improvement. The Regional Cooperative Education Advisory Committee is co-chaired by Thelma Whelan (Avalon Consolidated School Board) and Maureen Dunne (Roman Catholic School Board For St. John's). Other participants are: Western Avalon Roman Catholic School Board, Conception Bay South Integrated School Board, Ferryland

Roman Catholic School Board, and the Pentecostal Assemblies School Board.

The regional committee developed a Centralized Employer Database which identifies employers who offer high school students learning opportunities in the workplace. The host computer, located at Brother Rice high school in St. John's, connects all high schools in the region. The database is now in its second year of operation and is being continually upgraded.

Regional in-servicing for teachers trains them to use that employer database. The committee also produced a manual for all schools to follow in dealing with employers and work placements. The manual lists 610 employers, related courses of study, and the current status of work placements.

The success of the cooperative education initiative encouraged the advisory committee to consider other areas where educational partnerships

can work. The cooperative education program demonstrated how students and employers alike benefit from work placements in the community.

The same principle can be applied to areas other than work experience. A school begins by identifying a need such as improving writing skills. Resource people from the community are approached to help and they, in turn, are given access to the services provided by the school. The committee developed an Educational Partnership Resource Guide to assist schools in the region to initiate their own partnerships based on their unique needs.

The advisory committee also selected career education as an educational partnership program. Regional collaboration makes possible more accurate information on early school leavers and graduates. The six boards are implementing more efficiently career education initiatives that focus on realistic career opportunities. The committee also concluded that strate-

gies are needed to develop skills which will meet specific business and industrial growth opportunities with a special emphasis on technology. A variety of initiatives is also required to establish an effective liaison between high school and post-secondary educational programs so that a true continuity of learning can take place. Skills developed at one level are logically built upon at the next level. The result is a higher standard of knowledge and performance in all students.

Partnership in career transitions is the next challenge. A regional collaborative effort will offer students the chance to work with mentors, gain workplace experience and meet with those who have training in careers the students are considering. Sessions will be held to enable students to integrate what they learn in the workplace and in school. For example, an in-school session on cooperative education and career exploration will include discussion on employability skills and stress management. Workplace experience will enable students to understand how these concepts apply on a practical level. In this program, students take advantage of experiential learning while still in high school and will be better able to make successful transitions to post-secondary educational programs. The transitions partnership will bring together instructors from all levels of education. The advisory committee is in the early stages of planning a teacher cooperative program, which will provide for personnel exchanges among school teachers, employers, and post-secondary instructors. Teachers return to their schools and colleges with valuable experience that can be incorporated into instruction.

Two people have been hired to act as proponents for change in the education system and in local communities. The Educational Partnerships Facilitator, John Hennebury, promotes

mutually beneficial relationships between schools, business, labour and community organizations. His job is to build an effective liaison between teachers and community representatives interested in cooperative education, and to monitor and evaluate community-based learning programs. The Career Education/Transitions Facilitator, Bonnie Hayward, coordinates career education initiatives from kindergarten to level III. Her task is to help students focus on realistic career opportunities.

Greater involvement in our education system by business, labour and community organizations must be a priority in order to increase the relevancy of education and training for both the individual and the community. Education and training institutions need to collaborate with each other and with the workplace and government, sharing information and resources to develop a more responsive education system. A potential benefit will be more efficient use of existing resources within the community. This project involves industry, labour, youth agencies, secondary and post-secondary institutions, apprenticeship programs and a variety of career support services. Further integration and networking between education and other organizations in the community are essential to create, develop and maintain a lifelong learning culture. Ω

Project Partners:
Western Avalon Roman Catholic School Board
Conception Bay South Integrated School Board
Roman Catholic School Board for St. John's
Ferryland Roman Catholic School Board
Avalon Consolidated School Board
Pentecostal Assemblies School Board

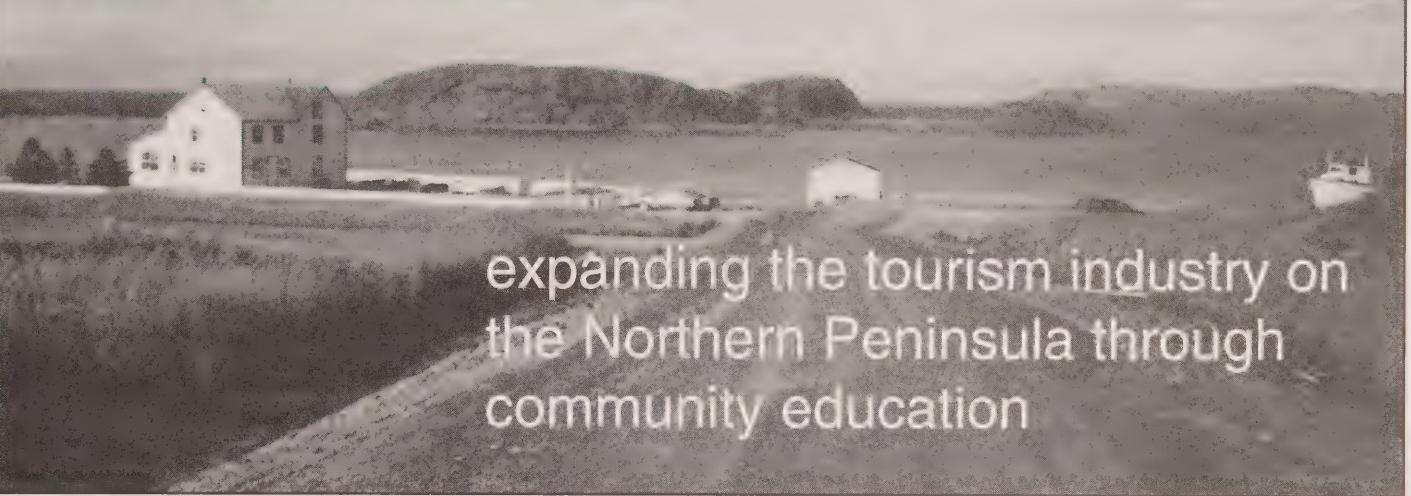
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Project Profile

Tourism Works!



expanding the tourism industry on
the Northern Peninsula through
community education

Community education presents an opportunity to involve local and regional agencies in a partnership for change and development. It also promotes local ownership of both problems and solutions, and encourages all participants to work towards common goals.

A coordinated approach to development is the focus of a pilot project on tourism currently underway on the Great Northern Peninsula. This collaborative effort began in March of 1994 when human resource development personnel, community groups, government and educational agencies designed a strategy to enhance tourism awareness. The outcome is a project which has two components, "Tourism is You" and "Tourism Works", sponsored by the Viking Trail Tourism Association. The purpose of this project is to develop an appreciation of resources in the area and to identify potential education, training and employment opportunities.

"Tourism is You" was a series of eighteen, one-day workshops held in June and July of this year to develop

community awareness of the importance of tourism. Workshops were held in sixteen communities on the Northern Peninsula and in the communities of L'Anse Au Clair and Red Bay in Labrador. Topics included the study of the natural resources of the region and their importance to the development of this industry.

"Tourism Works", a six-week training program, began in mid-July. In-service seminars for instructors were held in advance of the program, giving facilitators an opportunity to design a curriculum model. The training program brought together approximately 90 young people, ages 14 to 18, to learn how tourism could become a vital part not only of their community but of the entire region. Local high schools, Westviking College, and Norpen Private College participated.

Group projects were varied but each focused on some aspect of entrepreneurial development. Employers in the hospitality industry served as mentors to students, but also participated in segments of the program in order to

update their own skills. During the six-week program, the students got a chance to explore various places that cater to visitors. The students were treated to slide presentations on environmental projects such as the Eider Duck Program at Main Brook and the River Enhancement projects on the eastern side of the Northern Peninsula. They took field trips to Three Mile Lake Provincial Park, The Hogan Trail in Hawkes Bay, graveyards in Anchor Point and Forrester's Point and Grenfell House in St. Anthony. These activities were designed to encourage them to think about ways in which present tourist sites could be improved. In addition, the students were taught employability skills such as how write a resumé and how to develop a business plan. Everyone benefited from on-the-job work experiences, mentoring and job shadowing.

A group of seven students developed a strategy to improve tourism in the area of Fishing Point in St. Anthony. This region is cited as one of the best places on the Peninsula to

view icebergs and whales. Following an intensive study of the history, geography, and cultural traditions of the region, the young people developed a proposal for guided tours along the boardwalks at Fishing Point. The tour includes rock climbing, a visit to souvenir stands and displays to illustrate the history of the area. Their strategy outlined financial projections for transportation and advertising as well as a time-frame for development.

Barbara Case, Community Education Advisor for ACOA, believes that attitude change is a key to a greater appreciation for the tourism potential of one's community. Participants began to look at their communities in new ways. "Tourism Works" helped to nurture a caring attitude towards local resources.

Phase three of the project involves a training plan which addresses gaps in the tourism industry. Certified programs, courses and learning modules are being designed to provide further training in business development, quality control and assurance, marketing, and entrepreneurship. An evaluation of the project is also being conducted, and students will benefit from a current re-vamping of the program for next year. Tourism

development on the Great Northern Peninsula has been identified as a key to a sustainable future. This project is designed to improve the economic climate and learning culture of the region by building a workforce in an area rich in tourism potential.

Proponents of this project believe that while tourism is a growth area in this province, the potential is hampered by educational and training gaps. This program provides an opportunity to address those gaps at the community level, promote tourism as an attractive employment opportunity for young workers, and provide introductory upgrading to those already in the industry. The intensive community consultation upon which this process is based also encourages community and educational relationships which will further promote the development of the region. Ω

TRO Learning Centre
Viking Trail Tourism Association
Westviking College
Norpen College
COOPERATION Agreement on
Human Resource Development

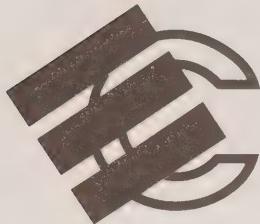
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Department of Education
Parks Canada
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Integrated School Board
Vinland - Straits of Belle Isle
Integrated School Board



The boardwalks at Fishing Point



Small Business Home Study for Women



Eastern College delivers a business course to women in Newfoundland and Labrador in their home communities

Recent trends in home-based business and a rapid growth in the number of women entrepreneurs have spurred demand for an innovative Small Business Home Study Course for women. The idea originated from discussions between Steve Quinton, principal of Eastern College, and Nancy Creighton, former executive director of the Women's Enterprise Bureau. The bureau was searching for a way to add another educational opportunity to those they already provide. The program was designed by the bureau and Eastern College, Clarenville campus, and marketed through the regional offices of the Women's Enterprise Bureau. The bureau's executive lobbied what was then Canada Employment and Immigration Commission (now Human Resources Development Canada, HRDC) and got them to sponsor many of the students for this distance education course. HRDC is now reviewing its

policy on supporting distance education generally.

The Home Study course recognizes the potential of small business opportunities and the need to provide information and training in that sector. Its principal objective is to give women in Newfoundland and Labrador the opportunity to develop the knowledge and skills necessary for self-employment. The course combines distance education technology with one-on-one counselling. Program facilitators are aware of mobility restrictions and other obstacles facing women with family responsibilities. The ACOA/Enterprise Network and TETRA make this program available to women throughout the province. The course is coordinated by Eastern College, Clarenville Campus.

Judy Green, the program's instructor, is proud of the individualized approach. "We keep in touch with each student on a regular basis. At the beginning, I carry out an orientation

to the program by a telephone conference call. Basically, this allows me to walk the student through the program and address any questions or problems she may have." In the fall of 1994 there were thirty-five participants enrolled from various parts of the province, including eleven in Labrador. Thirty of these students are in the second term of the program. The course is set up on a module basis allowing students to enter the program at any time and work at their own pace. Applicants are screened by Eastern College, the regional offices of the Women's Enterprise Bureau and HRDC. Business information consultants from the Bureau's six regional offices help students in their own communities. These consultants, for example, will provide the student with assistance in using a computer. The program will be offered through the winter of 1994 and accepts new students each month.

The thirty-week course consists of

sixteen modules designed to help students learn how to develop a business plan, evaluate opportunities and understand financing. The College recommends that students spend 25 to 30 hours a week on the course and in addition, the instructor is available to assist the student through teleconferencing. Students learn about legal issues, franchising, human resources management, exporting, intellectual property, bookkeeping, business communications, business mathematics and computer applications. The program is individualized and competency-based and introduces students to information technology through the use of computers. It also encourages the participants to take advantage of on-line information services such as the ACOA/Enterprise network.

Green notes that the home study method makes her a facilitator in the learning process. "Distance education demands good organization on my part, and by the students." She receives assignments through the mail and tries to return them as quickly as possible. Evaluation of the program is based on standards set by Eastern College. The students' progress is

monitored by both the instructor and a representative from the Women's Enterprise Bureau. Achievement in skills is at the mastery level and students must obtain a mark of 80% in each module.

Evaluation indicators will include the number of successful business starts and the number of students who go on to participate in further business related training or employment in the small business sector. Green believes that the program has been successful in helping rural women see their potential and in building their self-esteem. "Many of the women enrolled in this course already own small businesses. They have moved away from the traditional occupational roles for women." Training women for self-employment gives them independence in the workplace and provides a number of career options. Steve Quinton is optimistic. "This program is very much a self-directed learning process", he says, "and that's something we like to encourage here."

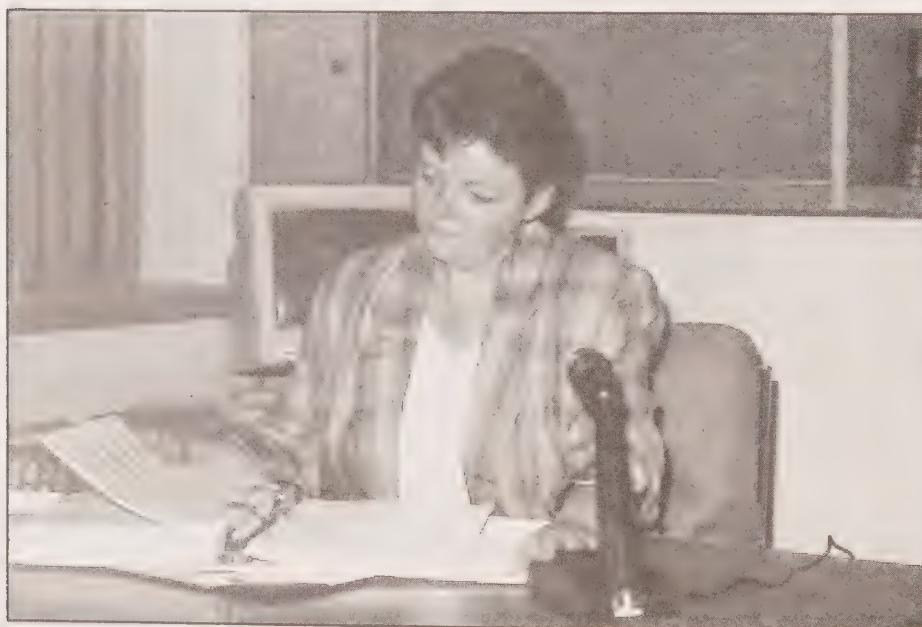
The use of information technology and on-line systems to deliver a small business program to women in rural Newfoundland and Labrador

meets an important need in the province's business sector. Although this is a pilot project, Eastern College and the Women's Enterprise Bureau anticipate the delivery of other programs through this method in the near future. Ω

Project Partners:
Eastern College
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ACOA Enterprise Network
Human Resources Development
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Instructor, Judy Green

Prior Learning Assessment

giving credit for learning gained from work and life experiences

In recent years, the average age of students entering post-secondary institutions in Canada has been steadily increasing. Adult learners are well aware of the need to be competitive in a job market where keeping pace with technological changes is crucial. These students enter post-secondary programs with knowledge and skills gained from years of working and living. The formal recognition of such non-credit learning could save the student valuable time and money, and result in a more efficient use of public training resources.

The Prior Learning Assessment policy administered by the Cabot College of Applied Arts, Technology and Continuing Education is a systematic method of assessing prior learning for the purpose of awarding credit. The program is based on the recognition that people learn without having to be taught formally in a classroom setting. Prior Learning Assessment provides the opportunity for adults to receive credit for this prior learning, allowing students to concentrate only on the courses in their program of study for which they have not acquired sufficient or appropriate learning. Students are encour-

aged to identify, articulate and demonstrate past learning and have it measured against predetermined standards. Through a comprehensive process, a student's past work and life experiences are analyzed and learning outcomes are documented. Credit is awarded for the learning gained from experience, not for the experience itself.

Three years ago, as part of a pilot project with Early Childhood Education, Cabot College initiated Prior Learning Assessment. A coordinator, Sandra Evans, was hired to develop and implement the assessment. A policy was put in place and has since been used in other programs, including the Computer Studies Co-operative Program and Security Services.

From the students' point of view, Prior Learning Assessment can be an important catalyst of lifelong learning. It makes college programs more accessible to adults by recognizing college-level skills that they have already acquired. In programs where prior learning assessment is administered, applicants are sent a letter outlining how the policy works. They are encouraged to study course outlines

very carefully and decide whether they have any non-credit learning that might be used as credit in the program. It is possible, for example, for students to bypass the first year of a program because of a combined credit they have from credit courses completed elsewhere plus non-credit experience and training. The possibility of saving time and money is particularly crucial for adults with family responsibilities and an urgency to be retrained.

Students in the Early Childhood Education distance program complete the Portfolio Development Course through distance education or on campus over a twelve-week period. A portfolio is a manuscript that documents learning gained from work and life experiences. They are then given three to four months to compile their portfolios after completion of the course. Sandra Evans believes this program is a great motivator. "Giving credit for learning is a great way to build on students' self-esteem by enabling them to understand that some of their life experiences have value in a way they would not previously have thought possible." To allay criticism of Prior Learning Assessment as a lowering of standards, Evans points out that the program is "completely faculty-driven". Faculty members are given the final say in the process of awarding credit.

The assessment of an applicant's non-credit experience generally involves a variety of evaluation tools, including written examinations, interviews, essays, performance evaluation, simulation, and mini portfolios. Documentation is an essential part of the assessment. For example, all conferences, workshops, seminars, and job experiences must be fully documented. Students are asked to give a written chronological record of any activities or experiences which they then "challenge for credit". Evans offers a



Early Childhood Educators work with preschool children at Cabot's daycare facility

hypothetical case where prior learning assessment applies. The applicant is a mother of three children. She has no formal post-secondary training and wishes to enrol in the Early Childhood Education program. She has worked as a cook in a local restaurant for two years and has assisted with accounting in her husband's business. She has several years' experience as a community volunteer with children's groups and has recently worked in a local daycare centre. When she applies to the program, she could "challenge for credit" some of the 36 courses, such as Nutrition, Safety, and Bookkeeping.

The implementation of Prior Learning Assessment on a province-wide basis requires training for all involved in its administration. Currently, Cabot College coordinates the design and delivery of the Prior Learning Assessment training for those who wish to introduce the policy in their respective learning institutions. The training consists of three sessions, each two and one-half days in duration, which are to be delivered over a one-year period. The orienta-

tion session was held in St. John's and was open to personnel involved in the public post-secondary sector throughout the province. They included some Department of Education staff, College Admissions and Registrar's Office personnel, faculty of first-year courses, and management from the community colleges and university. The first "Train the Trainer" session, Level I, will be held in five regions of the province in order to target more people and to avoid inflicting substantial travel costs on the participants. Training includes an elaboration of the concepts introduced at the orientation and the development of skills in the application of Prior Learning Assessment. Another "Train the Trainer" session, Level II, will be also held regionally and is a continuation of the application of skills presented in the Level I session. The Prior Learning Assessment coordinator from Cabot College is available for consultation as needed. At the end of each training session, an evaluation will be completed by all participants and a summary of the evaluations compiled for the coordinator.

The policy of Prior Learning Assessment has been operating in some areas of the United States for the past forty years and in some provinces of Canada for the past fifteen years. As part of the research, the coordinator has been in contact with national organizations involved in similar programs. However, Cabot College has developed its own systematic model specific to the needs of the province. This includes a comprehensive policy which addresses academic and administrative standards and assessment procedures.

Other colleges in Newfoundland and Labrador have expressed an interest in adopting the prior learning assessment model for their use. Those involved in the project believe that the implementation of a Prior Learning Assessment system will be beneficial to students, post-secondary institutions, government and the community. Ω

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Leadership for the 90s and Beyond



Westviking College is training instructors to become leaders of the future

Westviking College of Applied Arts, Technology and Continuing Education in Stephenville, is pioneering a project entitled "Leadership for the 90s and Beyond". The program is training potential instructional management candidates for leadership positions in the community colleges of Newfoundland and Labrador. The program began in June, 1994 and is the first of its kind in Canada.

Douglas Fowlow, President of Westviking College, saw the need to train instructors for administrative positions and organized the first Atlantic Colleges Management Development Institute (ACMDI). The Institute has now become an annual event and is held in Sydney, Nova Scotia each spring. This leadership training program has evolved from the Institute. The two-year program takes a cooperative approach and is designed to enable college instructors to become instructional supervisors.

To be eligible for the program students must have at least a bachelor's degree and three years teaching experience. Potential candidates are iden-

tified within the college system. A carefully monitored mentoring program gives them the opportunity to enhance leadership skills within their own individually tailored development plans. The nineteen students currently enrolled participate in the program of formal and informal study and practical "apprenticeship" with a seasoned and successful administrator. The curriculum consists of a series of instructional modules. Emphasis throughout the program is placed on entrepreneurial skills appropriate to today's college environment. The course involves training in motivational techniques, conflict resolution, strategic planning and total quality management, including performance appraisal and evaluation. Two weeks in late August are spent at the Stephenville campus of Westviking College. At the end of a two-year period, candidates are given a summative evaluation to include, if they wish, in their curriculum vitae. St. Francis Xavier University in Antigonish, Nova Scotia will be awarding two credits for the program towards the completion of a Master of Education degree in Administration.

College administrators hope that this initiative will result in a larger pool of internal applicants for management positions in the future, particularly female candidates and people of aboriginal origin. The project will also encourage current instructors to consider enhancing their managerial and entrepreneurial skills through an ongoing learning process. Ω

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Elderhostel:



a program designed to help older adults continue their lifelong learning

For many people learning is a life-long endeavour simply because they enjoy it. They are naturally curious, energetic and active. Many older adults continue learning by participating in Elderhostel programs.

Elderhostel is a non-profit educational organization which offers inexpensive, short-term academic programs to people usually in their mid 50s or older who have retired or are planning to retire. Elderhostel provides them with educational adventures. The programs are hosted by educational institutions around the world. Elderhostel is an international organization and last year almost 300,000 people worldwide were enrolled.

ELDERHOSTEL Canada was formed in 1986 and as of 1993, in cooperation with 25 institutions across the country, it has offered educational opportunities to over 18,000 older adults. Robert H. Williston played an important role in the creation of ELDERHOSTEL Canada and still acts as the executive director of the organization. Elderhostel offers a

vast variety of programs in many countries around the world. The spring catalogue lists over 175 different programs available in Canada, the United States, France, England, Ireland, Northern Ireland, Scandinavia, Turkey and Barbados. The courses take place at sites of historical interest, national parks, game reserves and sanctuaries, at university and other educational institutions. Bicycle programs are offered in England, France and the Netherlands.

Penny Darling, the assistant director of programming with ELDERHOSTEL Canada in Kingston, Ontario, believes one reason Elderhostel is popular is because of the variety of programs. Two unique programs are the intergenerational program and a train travel project. The intergenerational program accommodates grandparents and their grandchildren from ages eight to fourteen. They participate in a course that emphasizes outdoor activities and environmental study. The train travel program is offered in cooperation with VIA Rail. Participants travel between

Toronto and Vancouver. The course is offered on the train and at various locations along the way.

Elderhostel makes these programs accessible to its members at an average cost of \$340.00 per program.

"Hostelships" are offered to some who may find the tuition beyond their means. In most cases participants are required to provide their own transportation to the program site, but the fee includes the cost of meals, accommodations and program tuition while they are attending the course.

Two Elderhostel groups met in St. John's this summer at Memorial University. Thirty-six people participated in the first program and forty-six in the second group. Joyce Joyal, the Elderhostel coordinator at Memorial University's Division of Continuing Studies, says both sessions were well received by the Elderhostelers. Participants came from a wide variety of backgrounds but have a love of learning in common. Both groups attended lectures on Newfoundland history, and Newfoundland plants, wildlife and the marine environment. Many participated in genealogical studies at the Provincial Archives. Accommodations and meals were provided through student housing on campus.

In addition to the lectures, the Elderhostelers were treated to tours of the city, the various departments of the university, the Botanical Gardens, and whale-watching on Bird Island Tours. Joyal noted the energy and initiative of the participants. She said the programs' organizers found their own perspective on the city and university changed as a result of their interaction with the Elderhostelers. It was, in many ways, a two-way learning experience.

The enthusiasm of the participants is a key factor in the success of these courses and Darling says that positive experiences are common to



Whale watching was a popular side trip for the Elderhostelers.

the programs offered at all sites.

ELDERHOSTEL Canada publishes a catalogue four times each year. For more information on Elderhostel programs contact Joyce Kennedy at the regional office in Halifax, Nova Scotia. Ω

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Project Profile

Learning From Newfoundland Manufacturing



the Newfoundland Manufacturers' Association is helping Memorial University business students learn about manufacturing principles by showcasing local companies

Students enrolled in the Business Administration program at Memorial University will have a unique opportunity to watch theories they are taught being put into practice at the local level. "Manufacturing in Newfoundland and Labrador" is the theme of a collaborative effort in video production developed by the Newfoundland Manufacturers' Association, the Faculty of Business Administration at Memorial University and the P.J. Gardiner Institute For Small Business.

Students in the Production Management course are taught concepts and theories of industrial management. They study such topics as plant location, quality management, delivery and distribution, forecasting, and inventory control. Unfortunately, all of the course material, including texts and video footage of factories and their operation, is oriented towards large scale manufacturing such as automotive suppliers, large steel mills, and consumer electronics. Students are rarely given the opportunity to learn about smaller scale manufacturing in this province.

The Newfoundland Manufacturers' Association is currently developing one pilot video on Newfoundland manufacturing to be used in this course and potentially in various other levels of education and

training. The video will be approximately fifteen to twenty minutes in length and composed of two segments. The first half will give an overview of the manufacturer. It will focus on the multifaceted nature of the manufacturing process and on the interrelationship of different departments as they cooperate to create a finished product. Several issues are addressed, including seasonality, exporting, and distribution in sparsely populated regions, all of which will become the basis for class discussion. The second section of the videotape will probe one manufacturing company in depth on one specific issue, such as delivery, distribution or product quality.

Partners in this project are considering the feasibility of producing a complete series of eight to ten videos on Newfoundland manufacturing and related subjects. Participating industries would be selected by the Newfoundland Manufacturers' Association and the Faculty of Business at Memorial University. A close collaboration between the faculty and the Newfoundland Manufacturers' Association in the pilot ensures a balance between advanced theories and concepts of modern manufacturing and what is practical and feasible in Newfoundland and Labrador. The proposed video series would highlight

provincial companies and illustrate techniques that have worked. The series would also present possible solutions to the challenges confronting local businesses, enabling students to benefit from the lifelong experiences of those who are currently working in manufacturing.

While the pilot video is being made specifically for undergraduate teaching at Memorial University, the proponents hope that they will find a wider application among high schools, colleges, industrial training courses, and the manufacturing workforce. Ω

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Human Resource Development in Newfoundland Business



three companies develop employees' potential, and hone their competitive edge

The importance of keeping up with technological change and new approaches to business cannot be overemphasized. Markets are continually shifting, new products are being developed at an incredible pace, and production methods are being upgraded or changed with much greater frequency than they have been in the past. In order to deal with the dynamic nature of world business, companies are taking new approaches to human resource development. They are encouraging their employees to become lifelong learners and bring new skills and new ideas to the workplace. The Canada/Newfoundland Offshore Petroleum Board, Terra Nova Shoes Ltd and Newfoundland Telephone are three companies that engage in progressive human resource development programs to enhance the skills of their workforce.

The Canada/Newfoundland Offshore Petroleum Board is the smallest of the three businesses,

employing a staff of 43. This regulatory agency was established in 1985 to administer the exploration and development of the petroleum resources off the coast of Newfoundland and Labrador within Canadian territorial waters. The board allocates drilling sites and monitors industry activity to ensure that oil companies are in compliance with government regulations concerning exploration, production and safety management programs. The board is divided into eight departments. The work of each department is unique and requires the services of people from a variety of occupational groups. Engineers, geoscientists and other professionals perform the technical duties demanded in the environmental affairs, exploration, operations and safety, and reservoir engineering departments. Clerical, business administration personnel, researchers, and legal staff perform the tasks required in the administration, financial services, industrial benefits, and legal and land departments. Mark

Walters, the director of human resources, is responsible for maintaining the delicate mix of people and professions necessary to make the company function smoothly.

Part of the mandate of the director of human resources at the petroleum board is to oversee a program of development for the employees. This is a challenge in a small company that requires such diversity of skills. Training programs geared to the oil industry are very expensive and it would not be cost effective to offer a significant amount of in-house training in specialized fields because only a few employees would be able to participate. With the support of the board, Walters manages a program that helps to keep the board's employees current. He also helps staff members who want to improve their skills to prepare themselves for future promotions or changes in their work assignments.

The program is geared to an annual review process. The eight managers conduct a review of the employees in their departments. The employees are asked to participate in a self-evalu-

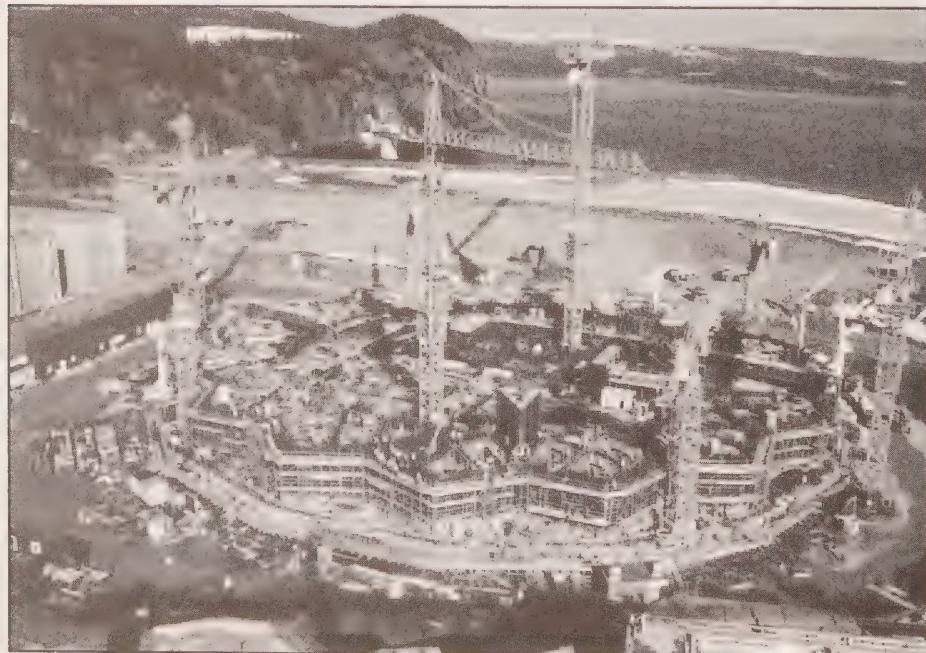
ation and discuss with the human resources director their strengths and weaknesses. Employees are encouraged to take part in a course or training program to help bolster areas in their work performance that may need improvement and to upgrade their knowledge of a topic that has undergone substantial change. Engineers, for example, may want to study the technical aspects of a new safety management system, or platform design, or perhaps improve their writing skills. Once a need has been identified, the employee collaborates with his or her supervisor to find a course that will provide the appropriate training. An application is then submitted to the human resources director for approval. The cost of tuition and books is covered by the board with the proviso that the books are placed in the board's library once the course has been completed. If the course is offered during the work day, arrangements are made to accommodate the study schedule. Employees who have to travel to take a course are also provided with travel expenses, board and lodging. Most of their training needs

The program works well because employees take an active role in their own professional development.

are met with programs offered in a short course format.

Walters says the program works well because employees take an active role in their own professional development. Sound development practices have kept the staff challenged. The program is a source of new ideas for the organization and helps keep the staff fresh and up-to-date. Employees take advantage of the program to improve their skills or increase their job mobility potential. "I like our employees to cross-train as well," says Walters. "The more they know about the different jobs in their department the better they will understand their own job, where they fit in the larger picture. It also means that we can help each other if we are temporarily short of staff."

Companies in the manufacturing sector of the province's economy are also working diligently to improve their output. In Harbour Grace, Terra Nova Shoes Ltd is continuing the community's long tradition of shoe making. The 120 employees produce three different models of work boots in over 90 styles at a rate of 1200 pairs per day. The company's products



The construction site of the Hibernia platform

account for an impressive 20% of the North American market. The majority of the employees are expected to perform tasks very specific to the manufacturing process. Training occurs when improvements to the process are implemented. Most of this training is done in-house but occasionally office workers complete courses outside the company.

Dave Gill, general manager of Terra Nova Shoes, believes that he has to keep up with changes in the industry in order to hold a competitive stance. "The process is always changing, it's the nature of the industry," says Gill. For example, the company has made four changes in sole technology over the last twenty years. In September 1994, they introduced new robotic equipment. When new equipment is installed, Gill and the plant technicians will receive training from the equipment suppliers either on site or at the facility where the equipment is manufactured. The technicians then train their fellow employees. The training is very skill-specific and is done on the job. Gill says that the transition to the new technology is faster when employees are given the opportunity to make suggestions on how to improve the efficiency of the process. He admits that the new methods do take time to learn but the employees see immedi-



Stitching work boot material at Terra Nova Shoes

ately where it will benefit them.

Four years ago they introduced a computer network into the plant to track production. Gill and Ray Walker, the plant manager, were eager to make the new technology as efficient as possible, while keeping the training time to a minimum. Once again, they went to their staff for suggestions. Employees had input into the design of the new system. It was much easier to learn and implement new software that was written to their specifications. "The computer technology was made to conform to us, which is important given our unique manufacturing process," said Gill.

Changes in technology have influenced all areas of our economy but few sectors have been affected as much as the communications industry. At Newfoundland Telephone approximately 1,650 people work to provide communications services, making this company one of the largest employers in the province. Newfoundland Telephone has undergone phenomenal change in recent years and the services they offer have increased significantly. Accommodating these changes has given the company the challenge of integrating new technology with the large infrastructure that already exists. Human resource development has played a very important role in this process.

Anita Wyatt oversees training for management and technical personnel, while Dan Gogal provides training services in personal computing. Both believe that changes at Newfoundland Telephone have worked as well as they have because of a positive attitude towards lifelong learning and good customer service. Wyatt claims that the impetus for employee training and upgrading comes from two levels, from management's awareness of ever-changing technology and the need for

Employees had input into the design of the new system. It was much easier to learn and implement new software that was written to their specifications.

The movement to PC networking was a very necessary step but demanded a great deal of initial training and then upgrading.

company employees to be prepared to deal with the new technology before it arrives, and from the employees themselves, who wish to continue to learn. Employees who came into the company with a particular set of skills are realizing the need to develop new skills in a competitive market.

Wyatt points out that the intro-

duction of new technology affects several groups of employees. New terminology and procedures which come with the changes in technology must be learned by all those involved in the process. For example, when new call routers are installed employee skills in a number of areas will need to be upgraded. Some employees will require training in the operation of the hardware while others will need to become proficient with the software and will need to understand how the new equipment interacts with other systems in the company.

Manufacturers often require that those who use new equipment be fully trained in the use of the product and only certain designated individuals are certified by the manufacturer to train. The supplier may not back up the guarantee that comes with the equipment unless training has been completed.

Wyatt also oversees management training. This program is designed to teach or enhance management skills. Often there is a demand for these courses when a promotion is pending or the nature of an employee's job changes.

An important part of her job is determining whether a course is essential and meets the needs of the employees before company money, and employees' time and effort, are spent on the training. Her assessment determines if courses will enhance the skills employees already possess or will develop new skills required for them to continue with the job or move to a new position. For example, an employee who is being considered for a supervisory position may require training or upgrading in supervisory skills or labour relations skills. This change may foster development in interpersonal skills as well.

Dan Gogal performs a similar function as manager of the PC training program. He spends most of his time helping employees to develop new computer skills or improving the skills of employees already familiar with the technology. "PC technology is changing at a rapid pace. This is particularly true of software," says Gogal. "My task is to make this transition a more enjoyable experience for the employee, to help that individual see the value of the change for his or herself, the department and the company. The movement to PC networking was a very necessary step but demanded a great deal of initial training and then upgrading."

Not all of the Newfoundland Telephone's training needs can be met with in-house programs. Both Wyatt and Gogal are pleased with the partnerships they have established with the community colleges and with Continuing Education at Memorial University. "The Colleges have made a real effort to accommodate the needs of the company and the needs of the students. They tailor courses and design programs for us specifically," says Gogal.

The community colleges and new approaches to distance education have helped Newfoundland



Dan Gogal works with Marilyn Healey in Newfoundland Telephone's PC training facility.

It is essential to "keep doors open" for employees, to give them a sense that they are making a valuable contribution, to encourage them to see why they need to learn different skills to help them in their jobs.

Telephone offer programs to employees in rural areas of the province. In Burin, Newfoundland Telephone and the Burin campus of Eastern College cooperated to offer computer training to employees. Because these technicians were unable to break away from their daily schedule to attend a course, the company made the program available on Thursday and Friday nights and all day Saturday. A group in Carbonear is presently preparing to take advantage of a similar program in that area. While the courses are evaluated at the College level, Newfoundland Telephone also conducts its own evaluation to determine the value of the course to the employ-

ee. They encourage as much response as possible from the employees.

An Educational Assistance Program allows employees to attend university or colleges to take courses. The company will pay tuition and books. For those with substantial service (10 years or more), the company has approved educational leave with 25% salary and 100% tuition and books, plus a guarantee of a job upon return. Newfoundland Telephone is flexible with the schedules of employees to help them attend classes during the day. "This type of educational assistance is regarded as an ongoing process, not a temporary measure in difficult economic times," says Wyatt.

Gogal and Wyatt believe that the most effective employees are those who have pride in the work and the company they work for. It is essential to "keep doors open" for employees, to give them a sense that they are making a valuable contribution, to encourage them to see why they need to learn different skills to help them in their jobs. This will build self-esteem which in turn benefits the productivity of the company as much as it benefits the individual.

Wyatt welcomes opportunities to practise newly-acquired skills not only in her own job but outside the company as well. In general, employees who take advantage of the opportunity to learn new and different things are more likely to participate in community groups and projects. This gives them another opportunity to put into practise what they have learned and to continue the lifelong learning process. Ω

COOPERATION



The Cooperation Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the need of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community education and reward high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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Canada



GOVERNMENT OF
NEWFOUNDLAND
AND LABRADORS

Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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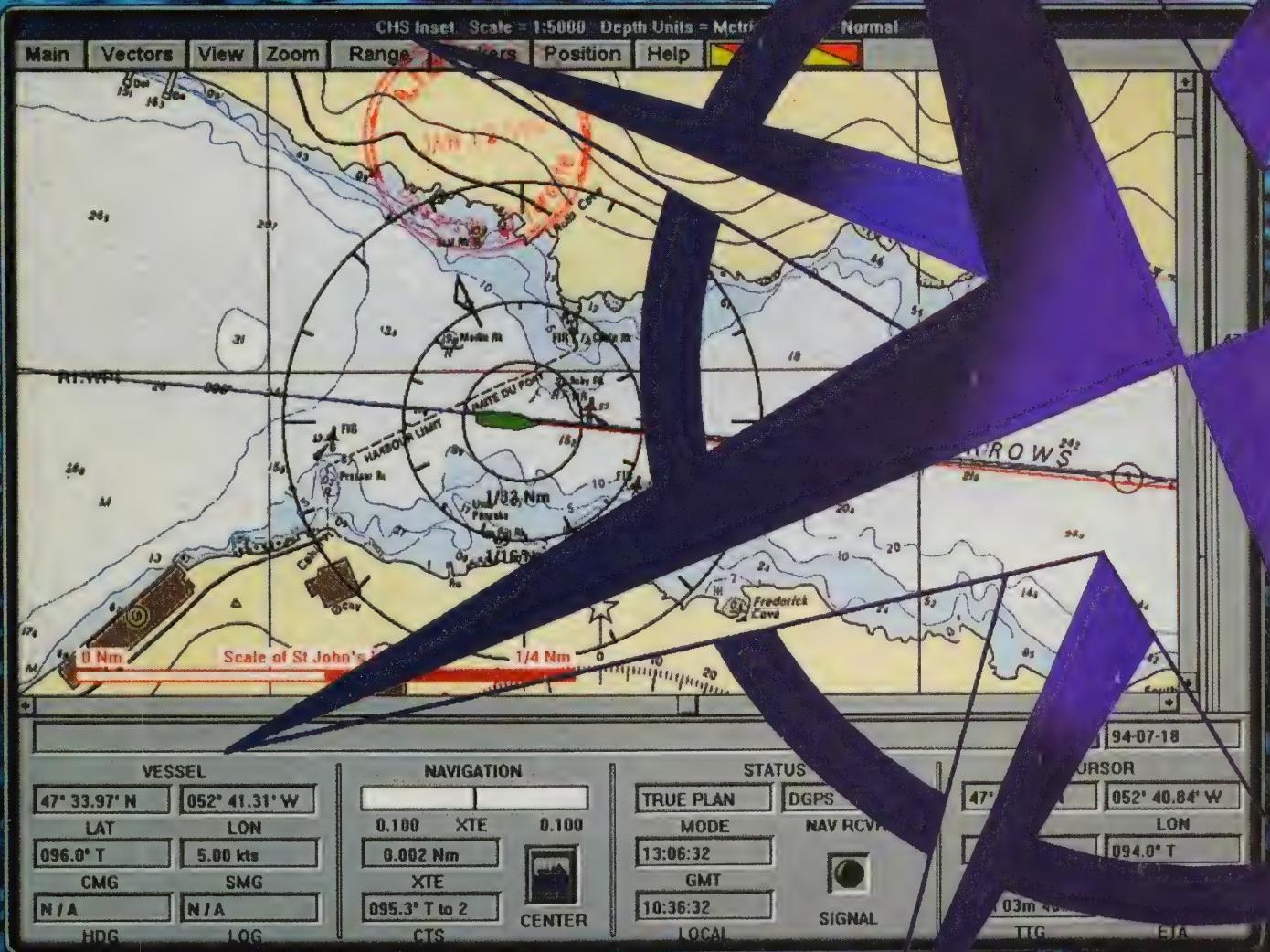
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Prospects

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Managing Change in Education



The Journal of the Canada/Newfoundland
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(The image of the computer navigation system used on the cover was kindly provided by Matrix Technologies of St. John's, Newfoundland. The photographs on pages 2, 5 and 14 were taken with the kind consent of the Conception Bay South Integrated School Board and the staff and students of Queen Elizabeth High School, Foxtrap, Newfoundland.)



Managing Change in Education

working together to plot the course

Our world is a dynamic environment. Over time, very few elements of our lives go unchanged. How we deal with these changes is a significant factor in how successful we will become. One way to handle change is to take control of it. The third issue of Prospects focuses on the various ways in which change in education is being managed.

The projects and features that are presented in this issue have three dominant themes: partnerships, local initiative and enabling technology. Change in education is a slow, ongoing process that will hopefully produce a high quality education system to serve our province. Building partnerships in our communities among parents, educators, government, and business will ensure that the changes made to the education system will address the concerns expressed by all sectors of the community. These partnerships will also reinforce the idea that education is not something left up to a few but is an issue that should concern all of us.

Forming partnerships on a community level creates an environment where many changes in education can be effected locally. Much of the literature on change in education suggests that the top-down approach to

change is difficult to administer and rarely achieves the desired result. "Enhancing Local Involvement in Education Through Quality Leadership" and "Improving Our Schools" are two projects presented in this issue that emphasize the importance of local control over change. Teachers and parents need to take ownership of the schools in their communities, assess the needs and concerns that are important in their area and plan a course of action to address these concerns.

The third theme deals with the role of technology in the changing landscape of our province's education system. Computer and communications technology offer great opportunities for our students to explore new concepts and tap into vast amounts of information. Administering the changes required to make these technologies a routine and significant part of our students' educational lives has raised many issues that will not be easily resolved.

This edition of Prospects marks the first time we have published articles by writers outside our editorial board. Dr. Bruce Mann of Memorial University's Faculty of Education examines three theoretical approaches to managing technological change.

Alex Hickey and Sharon Vivian profile the TILE (Technology in Learning Environments) project. An article by Dr. Alice Collins, Dr. Austin Harte and Janice Cooper looks at total quality management in education and the implementation of school councils. Dr. Patricia Canning and Dr. Elizabeth Strong present a project profile on the multi-grade classroom.

The next two issues of Prospects will deal with technology in education. The Spring 1995 edition will focus on **Distance Education**. The Summer 1995 issue will explore the theme of **The Technology of Learning**. Please send submissions to the editors at the address found on the inside-back cover. They will be carefully considered for publication.

We hope you find the articles in this issue informative and thought-provoking. Managing change in education is an ongoing process and a substantial body of educational research and knowledge exists to assist us, as a community of teachers and learners, to find a new and promising course.

Trudi Johnson
Albert Johnson
(editors)

Enhancing Local Involvement in Education Through Quality Leadership

by
Dr. Alice Collins,
Dr. Austin Harte
and
Janice Cooper

The Report of the Royal Commission of Inquiry into the Delivery of Programs and Services in Primary, Elementary, and Secondary Education, Our Children - Our Future (the "Williams Report", 1992) calls for increased local involvement in educational decision-making. It recommends the establishment of local school councils through government legislation. These councils consist of parents, teachers, school principals, and other community members.

Unlike the current Parent-Teacher or Home and School Associations, school councils derive their authority from legislation. They have direct input in school level decisions on curriculum, funding and staffing and they advise other levels, particularly school boards, on policy and practice. They assume responsibility for seeking ways to increase par-

ent involvement in school life, and to assess and communicate the overall performance of the school under their jurisdiction.

Memorial University's Faculty of Education is currently involved in a project aimed at enhancing parental and community involvement in education. The project consists of two interrelated sub-projects, the Exemplary Models of Parental and Community Involvement Project, and the Pilot School Councils Project. The Exemplary Models Project will develop case studies of schools which have successful parental and community involvement. The Pilot School Councils Project is an applied research project on the implementation of seven pilot councils in Newfoundland and Labrador. The principles and components of successful models as identified in the case studies will be used to inform school

councils on the development of strategies to encourage parental and community involvement.

Several criteria have been identified for maximizing the extent and the quality of parental and community involvement in education. One important factor is the willingness of the principal to build partnerships and encourage involvement. Other factors include: frequent and positive communication between home and school, training which facilitates effective involvement and leadership of parents and teachers, and written policies clearly stating the nature and extent of the parent/community role.

In selecting schools for the Exemplary Models Project, emphasis was placed on the extent to which these factors influenced the school climate. The schools that have been selected for participation in this project are:

- A. Garrigus Academy, St. Lunaire
- Bishops College, St. John's
- Brinton Elementary, St. John's
- Cassidy Memorial Elementary, St. Fintan's
- Centennial Central High, Victoria Cove
- Labrador City Collegiate, Labrador City
- McDonald Drive Elementary, St. John's
- Northern Lights Academy, Rigolet
- Paradise Elementary, Paradise
- St. Edward's Elementary, Brugis

Structured interviews, focused group sessions and document analysis will be undertaken at each site to develop individual case studies.

The movement towards greater local involvement in education has been spurred by the belief that increased parental and community participation has a positive effect on educational achievement. Education is increasingly viewed as a

family/community/school relationship. The research suggests that this partnership not only results in improved student achievement but also in an enhanced sense of pride in the community and school. Parents and educators have a greater willingness to support educational decisions. The relationship provides mutually beneficial support for both parents and educators when dealing with students in difficult situations.

beneficial to their schools. Geographic and demographic representation, size and school type (ie. elementary, secondary, all grade) were also considerations in selecting pilot sites. Schools selected for participation in the Pilot School Councils project are:

- A. P. Low Elementary, Labrador City
- Bishops College, St. John's
- Bishop O'Reilly High, St. Thomas Aquinas Elementary and St. Jean Vianney Elementary, Port au Port (as a system)
- Buchans Public School, Buchans
- Holy Redeemer Elementary, Spaniard's Bay
- Morris Academy, Mt. Pearl
- St. Kevin's Elementary, Goulds

... the Newfoundland and Labrador project is the first to precede full implementation with the piloting of councils...

While other jurisdictions in Canada have mandated school councils on a province-wide basis, the Newfoundland and Labrador project is the first to precede full implementation with the piloting of councils at selected sites. This will enable close monitoring, support and evaluation before full implementation of school councils throughout the province beginning in September, 1995.

Schools interested in participating as pilot sites were required to submit a formal proposal indicating how their involvement in the project would be

The Pilot School Councils project will examine several issues pertaining to the successful implementation of school councils. Among the components being piloted are composition, responsibilities and processes to facilitate effective decision-making, team-building and problem-solving.

The core membership of the pilot councils consists of the principal of the school; two teachers, elected by teachers; three parents, elected by parents; two community representatives appointed by members of the council; and, in the case of high schools, two students elected by students.

In addition, the project is piloting variations in membership. One site will include the vice-principal as a council member. Another will pilot a systems council with the principals of the high school and each of its feeder schools as council members. All councils will include either a school board central office representative or a school trustee.

School-based decision-making will give councils substantial power

School-based decision-making will give councils substantial power over how the school operates.

over how the school operates. Councils will make decisions at the school level and advise the school board on matters that affect the school.

Each pilot school council will establish a School Protocol Agreement between the council and its school board. The work of the school councils will be carried out under the agreement and the constitution and by-laws developed by each council. The agreement shall be subject to provincial legislation and regulations, and school board constitution, by-laws and policies.

Variations in the Protocol
Agreement negotiated between pilot councils and their respective school boards are anticipated. Pilot councils will delegate decision-making to the school level in areas such as programming, curriculum and school discipline.

The principles and practices of Total Quality Management will be used to guide the implementation and decision-making processes of the pilot school councils. Each council will pilot the effectiveness of TQM tools in facilitating effective decision-making, team-building and problem-solving within their local environments.

The philosophy and practice of TQM is based on the Japanese belief of kaizen, a personal dedication to mutual improvement and quality. While it has widespread use in business and health care systems, school

systems have only recently begun to explore various ways of adopting total quality as an operational norm.

The TQM movement was founded by William Edwards Deming. Deming promoted the belief that everyone's work in an organization is valuable. He believed that the quality of output in industry could be improved if those involved in production had more control over their work. He observed that the practice of end-of-line inspection could be curtailed or eliminated and consequently quality would cost less.

Deming also explored the application of TQM to education, advancing the notion of "schools of quality". According to this notion, everyone is part of the school community; all work for the same end. Deming challenged educators to create school environments in which strong relationships of mutual respect and trust would replace fear, suspicion and division. Schools would move away from hierarchical, top-down administration, to administration which works to empower teachers and students.

The application of TQM to education is appropriate in Newfoundland schools, given the reforms aimed at increasing parental and community involvement. The use of TQM in school settings goes beyond the notions of effective schools and school improvement by providing for collaborative approaches to problem-solving, team-building and

planned change, and shifts the locus of leadership from the principal to the quality-based learning team. In this sense, the application of TQM to education represents a further evolution of the effective schools and school improvement movements.

Furthermore, TQM provides a set of tools by which change can be initiated and monitored.

As educational reform in this province continues, the benefit of school councils will become evident. The move to larger school boards and the increase in the number and geographic distribution of schools necessitates a structural change that will enable local input in decision-making. For the system to work effectively, site-based management must be embraced. Ω

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Project Profile

Improving Our Schools

building partnerships at a local level to improve the quality of our schools

Effective change in education is an ongoing process which requires careful planning and consultation. Often, several years are needed to determine how improvements are affecting student achievement. In recent years, the Department of Education and Training has been addressing concerns about the academic achievement of students in Newfoundland and Labrador through the implementation and expansion of its school improvement program. The program builds on the belief that successful, innovative practices occur when all interested groups are given an opportunity to participate in how change will be implemented and what these changes will be.

School improvement projects

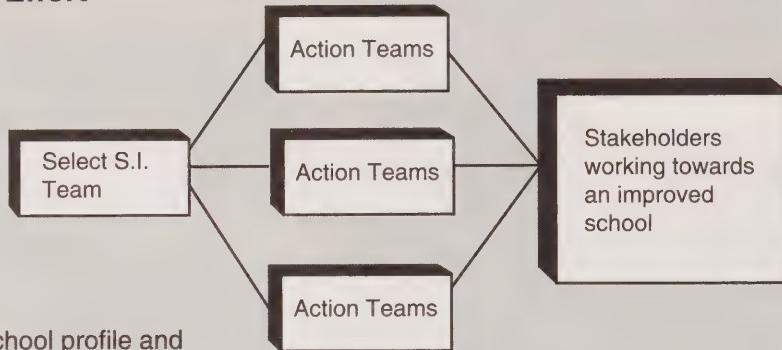
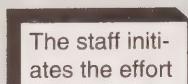
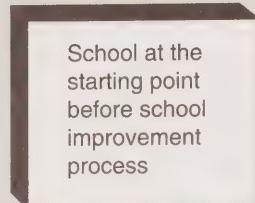
encourage site-based management. School staff members are encouraged to work as a team to achieve common goals. A collaborative effort enables them to build on their strengths and find solutions to their problems. It also breaks down the barriers that may exist between the school and the community by providing an opportunity to design and implement community-based solutions to local problems. Decisions are entrusted to each school staff. A school leadership team, which is representative of the various sectors of the school, provides leadership in initiating and coordinating school improvement efforts.

A specific framework is used to bring school personnel together in a school improvement program. This non-linear framework provides for a

readiness period in which staff members acquire essential skills in collaboration, team-building and conflict resolution. Schools often follow this period of readiness by developing a list of core belief statements, and by formulating a mission statement.

Another component of the school improvement process is the development of a school profile. This may be accomplished with the assistance of information available from the Department. Several school indicators are examined including a history of the school, academic results, parents' concerns, students' attitudes, and community involvement in the school. The school profile becomes the basis of the decision-making process to make changes to the school. The next step is to develop an

School Improvement - A Collaborative Effort



The staff and other stakeholders work on the school profile and mission statement. After these are in place, the staff members, with the support of the School Improvement team, identify concerns, plan a course of action and establish action teams to promote the implementation of solutions.

action plan for the school year. For example, the staff may have identified a weakness in discipline and decide to focus on that problem for the upcoming school year. The action plan may also address curriculum issues.

Improving communication skills through each course and grade level, for example, may be one objective of the action plan.

Most school districts across the province are participating in school improvement initiatives. For example, in Grand Falls-Windsor, the Integrated and Roman Catholic School Boards are working together on a three-phase institute designed to train leadership teams from nine schools in the area. Participants will be trained in conflict resolution, team-building and consensus-building. They will learn how to complete a profile of their schools and early in 1995, develop action plans which focus on goals identified by local staff members. On the west coast, the Appalachia School Board is taking a community-wide approach to focus on broad issues such as drop-out rates. The Labrador Roman Catholic school district has embarked on a comprehensive, site-based school improvement program. This school district considers its greatest strengths in pro-

fessional development to be using local teachers as trainers, working with volunteer teachers, providing local summer institutes and most importantly, creating partnerships with other jurisdictions.

The Department of Education and Training, in coordinating the school improvement initiative, is encouraging each district to be consistent with the reforms detailed in Adjusting the Course: Part II by designating school improvement coordinator at the district level. STEM~Net is used as one vehicle for school and district level networking. "The school improvement initiative gives ownership of the process to people at the local level," says Bruce White, the Department coordinator. "If real change is going to occur the people in the schools have to want it and believe in the process. This project offers us this opportunity."

The school improvement process places more decision-making in the hands of the teaching staff, determines the types of in-servicing required in a given district throughout the year and relies more on the expertise of teachers to address weaknesses in the school and district. At the same time, the school improvement process guides the professional development

of school staffs. Gary Hatcher, the Director of School Services and Professional Development, believes that the process is "encouraging teachers to think as a group and to determine as a staff what skills and knowledge they need." The team approach boosts staff morale and highlights the talents and commitment of teachers. Students benefit from more effective teaching and school organization. Ω

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Measuring Quality

The Provincial Educational Indicators System



What percentage of students in Newfoundland and Labrador, 16 years and over, are still in school? How do our students perform internationally in mathematics, science and geography? How do our students feel about the quality of their school life? Asking the appropriate questions to provide a complete measure of the quality of the school system is the challenge for those who are designing a provincial educational indicators system.

Over the past decade, the vast majority of resources aimed at improvement in the education and training system has been focused on the development of programs and services. Research has shown clearly that money spent on such development cannot produce excellence without measuring levels of success. At the same time, the Royal Commission on Education encouraged considerable discussion on ways to make the education system more accountable for the performance levels of those served by

the system. To address the demands for higher standards of excellence and improved accountability, the Department of Education and Training is establishing a system of indicators which will provide meaningful information about the major outcomes of education and the various factors that significantly influence them.

Traditionally, information about the education and training system has included such measures as the percentage participation in school, student performance on standardized tests, the percentage of high school students moving on to post-secondary institutions, the number of those graduating from post-secondary institutions who become employed, and the attitudes and values of students and educators. A goal of the Indicators project is to broaden the range of indicators to reflect all of the major goals of education and to link the reporting of indicators to these goals. Information of this type will

The goal of this project is to construct a set or system of indicators that will provide comprehensive and complete information in a meaningful way on the education and training system of Newfoundland and Labrador.

enable the Department, school boards, post-secondary institutions, parents and educators to assess the extent to which the objectives and expectations for education are being met.

An indicator is an item of information that reveals something about the performance or efficiency of a system. Information that is presented through the use of an indicator may involve a comparison over time, for example, graduation rates from 1984 to 1994. An indicator can show a comparison among jurisdictions, for example, among school districts, or a comparison against some predetermined standard or criterion, such as student attendance rates.

In education, no single indicator can provide adequate information to fully describe any particular aspect of the system. However, when used together and in a specifically defined context, indicators can become a very powerful instrument for decision-making and policy direction.

To provide an accurate assessment, the educational indicators for K-12 will focus on as many aspects of the education and training system as possible, broadly grouped under

inputs, conditions of learning, and outcome domains.

Inputs include resources such as finances, teacher qualifications, and facilities. These indicators place the education system in the context of society and therefore must include contextual indicators, for example, the socio-economic level of the population and community size. The category, 'conditions of learning', examines factors which have an impact on the learning process. This group measures opportunities for learning, such as attendance rates, student expectations and the factors which affect those expectations. It also addresses teaching conditions by determining pupil/teacher ratios, preparation and instructional time and professional development. The outcome domains include some measurements which are more easily taken than others. Outputs include participation, attainment, and student academic achievement. More difficult indicators to measure are aspects of personal and social development, behaviour, and satisfaction with the system. Utilizing combinations of these indicators can suggest which resources and practices contribute most successfully to the

achievement of the goals. Target audiences such as government departments, labour groups, community agencies, human resource development agencies and other decision-makers are then in a better position to recommend policies. Long-term outcomes to be measured include the literacy level of the population, labour force participation and employability skills.

The goal of this project is to construct a set or system of indicators that will provide comprehensive and complete information in a meaningful way on the education and training system of Newfoundland and Labrador. The provincial indicators system will provide more than basic outcome measures. It will supply information to help understand how these factors interact to produce the system as it is at a particular time. The challenge is to construct indicators which will provide information on the entire education and training system, Kindergarten to Level III and post-secondary institutions, both public and private.

Helen Banfield, education consultant and project team member working on the K-12 indicators, emphasizes the importance of determining what information we would like to know. This will require asking carefully constructed questions to ensure that the information will allow for analysis of the complete picture. "The timeliness of the information is vital. Too often in education we are left with outdated information. The set of indicators must be able to be sustained and reported regularly."

Dr. Samuel McGrath, educational consultant and member of the project team responsible for post-secondary indicators, explains that one of their objectives is to provide meaningful and valid categorization of post-secondary courses and programs. This will require a consensus on the mean-

ings of commonly used categories, such as the concept of 'continuing education'. Since the information will be made available for use by all post-secondary institutions, categorization and the system of measurement must be agreed upon.

The post-secondary system of indicators encompasses a wide range of measurements of public and private colleges as well as Memorial University. Indicators in post-secondary institutions include participation rates and attrition rates of students. For example, one possible measurement is the number of students participating in registered apprenticeship programs. This measurement could be further broken down into indicators of age, gender, rural/urban areas, size of high school and others. Indicators related specifically to university students include undergraduate participation rates in regular diploma, certificate and degree programs.

Indicators also provide information about post-secondary instructors. For example, one measurement may be the percentage of time instructors spend on administrative activity as compared to teaching and teaching-related activity. Postsecondary indicators may also pertain to finances, measuring for example, the average amount of annual student aid by recipient, campus, faculty, and department.

The system of measurement must be carefully designed. For example, while information on public examinations may be easily attained, determining students' perceptions of their opportunities to learn poses a more difficult challenge.

The Newfoundland and Labrador Educational Indicator System is not a completely new initiative. The Department of Education and Training has as one of its long-term goals the development of better

instruments of assessment. The Department currently collects a substantial amount of information in several areas at the school, campus, district, college and provincial levels. While the Profile series has in recent years laid the groundwork for this project, it has provided limited information and only on the K-12 system. Rather than simply throwing out conventional measures, this new indicator system builds on earlier work and the accomplishments of those in other jurisdictions. The indicator system will fill in the gaps in the information bases and provide new, effective instruments for gathering data. Moreover, Helen Banfield believes that the indicator system will "educate as well as produce statistics by making the information more readable and meaningful."

Other provinces have developed or are in the process of developing indicator systems. These programs tend to reflect the goals of education in each province and measure the progress of education systems towards meeting these goals. Several models for indicator systems exist in educational literature. The Department of Education and Training in its own approach to designing a system has been in close contact with other provinces involved in similar projects. For organizational purposes the Indicators project has been divided into four phases from September 1993 to March 1995. The work of this project will also be closely integrated with the ongoing initiatives of the Committee established to implement the recommendations of the Royal Commission report on education. Ω

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Approaching Change



searching for the best policies to bring computers into our schools

by

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The implementation of computer technology in the school environment has been identified as an important catalyst for educational change. How technology is introduced will have major implications for the success of projects. There are three approaches to this process: transformationalism, collaborationism, and incrementalism.

Transformationalism proposes that an overhaul of the education system is required before teacher development involving computers is possible (Becker, 1993; Lockard et al., 1994; Mann, 1994; Pelgrum & Plomp, 1993; Zorfass, 1993). Traditionally, this approach has meant that large sums of money are spent on new equipment and systems using the latest technology. Specialists are expected to make significant changes in performance. All planning and evaluation functions are directed from the top. Employees

assigned tasks have little input into planning or evaluating the processes. Typically, reactive organizations take drastic steps only after management is lost, rather than take initial steps to retain management that will put them into favourable situations. Moreover, employees and their representatives feel detached, uninformed and uninvolved in the performance and success of the organization. Transformative policy, therefore, often becomes an exercise in planned obsolescence.

Collaborationism advocates that educational reform should be spearheaded by collaborative interactions over computer networks, such as computer workgroups or computer conferences (Harrington, 1993; Flanders, 1991; Hunter, 1993; Mann & Weir, 1993). One reasonable assumption about collaboration over computer networks like STEM~Net (Science, Technology Education and

Mathematics Network) is that they change some of the ways in which we teach and learn from one another (Beals, 1992; Harris & Anderson, 1991; Newman, 1993). When interactions are planned, collaborative learning occurs (Eisenberg & Ely, 1993; Lowry et al., 1994; Mann, 1993; Traw, 1994).

A preferred position might be called incrementalism. Incrementalism is consistent with the Japanese management practice of kaizen meaning "slow, never-ending improvement in all aspects of life" (Mann, 1992b). Continuous improvement differs principally from the classical Western approach to improvement in that it relies on an investment in people, not on equipment. Incrementalists propose that in-service courses in educational computing be provided to assist teachers in how to implement computers in the instructional process (Arzt, 1991;

Kinnamen, 1994; Mann, 1992b; Simonson & Thompson, 1994). Preparing teachers to cope with and use computers in the classroom and laboratory is considered a complex task, continually buffeted by technological advances and constrained by resources (Ross, 1991). "Unless teachers become advocates of the change, the innovations are implemented pro forma, if at all" (Becker, 1993, p. 145).

Incrementalism encourages teachers to discover opportunities and disseminate their findings to other educators. Incremental changes can also be made to occur in other levels of the education system. Policy-makers in Newfoundland and Labrador, for example, have taken an incremental, bottom-up approach to policy development to improve the chances of implementation. Phase 2-3 of the "Technology in Learning Environments" (TILE) document (Eaton, 1994), written by and for educators of this province, proposes substantive and cost-effective improvements in the policies and practices of educational computing.

At most levels of the education system, successful changes to educational computing with a minimum of discomfort requires policy-makers' attention to several factors. The first factor affecting the successful adoption of educational computing is the support and leadership exhibited by the administration (Arzt, 1991; Lockard et al, 1994). Many educational computing facilities, however, are still planned and managed by non-computing administrators.

A second factor is an incremental adjustment plan of action. This type of planning should reflect the current total quality management trend in business which advocates 'several small steps' over the 'complete replacement' approach (Harvey & Green, 1993; van Vught, 1993). The

probability of successful implementation increases when technology plans are tied to the goals of the school or faculty (Wiburg, 1994). Therefore, proposed changes should also become a part of the larger vision for the school board or university in rethinking its purpose, structure and function.

STEM~Net at Memorial University serves teachers throughout Newfoundland and Labrador.

STEM~Net is currently in the second year of its three-year development. The hardware implementation and software training is being introduced gradually throughout the provincial education system. This network is constantly under development, managing and maintaining the educational quality of select computer networking services (Mann & Weir, 1993). Such plans, however, usually require large-scale expenditures of money, effort and time.

Individuals can also affect the successful adoption of educational computing with their own incremental adjustment plans of action. For example, Memorial University introduced an incremental adjustment plan of action to permit working teachers to complete an undergraduate course in hypermedia authoring (see side bar), toward a Learning Resources Diploma. Their common concern was the driving distance to attend the scheduled classes and labs. In the Winter 1994 semester, these students agreed to accept the responsibility for their own instruction, maintain access to learning resources, ensure adequate technical support and participate by posting timely online messages using STEM~Net's email software. These "self-directed students" agreed to forgo step-by-step instructions, practice exercises and constant feedback on their performance, since the course materials have not been developed. Before

enrolling in the course, these students obtained a STEM~Net account and ensured regular access to STEM~Net's Calvin computer from their school or home. They also agreed to secure regular access to a personal computer in their school or board with Windows and Toolbook software, CDROM and software, a video camera, and editing suite equipped with character and graphics generators.

Personalized systems of instruction of this kind can offer rewarding and satisfying experiences for students. Under these conditions, these undergraduate education students completed the same lab assignments and papers as their colleagues attending regular classes and labs. Self-directed students were told of the tendency to "let things go until it's too late". Like their counterparts, self-

Hypertext

The nonsequential retrieval of a document's text. The reader is free to pursue associative trails through the document by means of predefined or user-created links.

A hypertext application seeks to break away from a sequentially oriented text presentation of information and to provide the reader with tools to construct his own connections among the component texts of the document. A hypertext application is a form of nonsequential writing.

In a true hypertext application, the user can highlight virtually any word in a document and immediately jump to other documents containing related text. Commands also are available that enable the user to create his own associative trails through the document.

Hypermedia

A computer-assisted instructional application such as HyperCard that is capable of adding graphics, sound, video and synthesized voice to the capabilities of a hypertext system.

Pfaffenberger, Bryan. *Que's Computer User's Dictionary*, Carmel, Indiana: Que, 1990.

directed students agreed to collaborate on group-directed projects with other self-directed students living within their area. They expected, however, that there would be little, if any, peer support and no one reminding them to submit assignments on time.

Student achievement in both groups was roughly equivalent. The content of online participation of the self-directed group was of slightly higher quality than that of the in-class group who had both class and online participation. The hypermedia products and final exam results for the self-directed group were slightly lower than that of the in-class group.

In this way, an incremental adjustment plan of action was introduced to serve more undergraduate education students without compromising the integrity of learning experiences for the in-class students.

Policy-makers should be aware, however, that at least half again as many hours of the instructor's time were required to conduct this kind of online personalized system of instruction as were required for the regular part of the course.

A third factor affecting successful adoption of computing is applying the appropriate software and hardware to particular curricular computing areas. This has been called "articulation" (Lockard et al, 1994). Specific software attributes and the teacher's role should be the primary concerns of the articulation. The attributes (e.g., sound annotation) in the software should be assessed in the light of the expectations for learning and for use. Curricular software and manuals should be located and catalogued with other curricular materials for constant and easy access by in-servicing teachers (Mann, 1993). The placement of computers and curricular software in the Curriculum Materials Centre within the Faculty of Education at Memorial University has had the side

effect of updating the curricular materials within the Centre. Course requirements are gradually reflecting more sophisticated uses of these resources.

A fourth factor affecting successful adoption of computing is a pedagogical orientation in specific aspects of curricular computing. This process includes the development of personal competence goals and a personal repertoire for each school or university faculty member. This orientation replaces the traditional 'computer lit-

ered to be appropriate (Ragsdale, 1988; Willis, 1991).

Until 1991, the emphasis of the graduate level educational computing course at Memorial University of Newfoundland was on hypermedia authoring. Hypermedia authoring is presently offered as a special purpose undergraduate computing skill, and as an elective called "Software Prototyping and Evaluation" to the Computer Education graduate program. The revised graduate level emphasis reflects the changing expectations of experienced Newfoundland and Labrador teachers (Norris et al, 1992). The new "Computer Education" sub-specialization features two required courses: "Issues and Trends" and "Research".

A growing trend is to "have students program hypertext multimedia interactive presentations; this is one of the most valuable educational uses of technology there is" (Becker, 1993, p. 129). The consensus, however, is that there are more crucial concerns than developing one's own software (Geisert & Futrell, 1990; Lockard et al, 1994; Maddux et al, 1992). The primary interest in most schools is getting enough curricular and applications software for students and teachers to use. A second concern is that few educators in their job situations have the time or the need to develop CAI software (Geisert & Futrell, 1990; Maddux, 1992). Third, authoring software is often unavailable in most schools and school boards, so teachers do not have the authoring software required to develop their own programs.

However, these negative comments about hypermedia authoring in education do not diminish its perceived value among some educators and researchers. Policy-makers are advised, therefore, that hypermedia authoring should be implemented as a special purpose computing activity, in

*I ncremental
policy is the best
of the three
approaches because
of its reliance on
knowledgable peo-
ple over software
innovation.*

eracy' perspective of the mid-1980's which aimed to add computers to the curriculum as a special object of instruction. Undergraduate courses presently offered in the Faculty of Education at Memorial University of Newfoundland are designed to meet these goals.

General purpose computing requirements should differ for graduate and undergraduate education students. At the graduate level, a consultative, theoretical emphasis is consid-

concert with general purpose computing requirements.

A final factor affecting the successful adoption of computing is collaborative partnerships with outside organizations. These alliances help to reduce the inequity between educational and corporate values (Mann, 1993). One example is a recent partnership between the Newfoundland Telephone Company and the Faculty of Education at Memorial University in which computer education students were introduced to corporate technology (Mann, 1993). The six-week "Technology Orientation" to state-of-the-art technology took three forms: the tour; the work venue, and; the visit from company personnel. The student teachers agreed that their tour of the technical facilities and the subsequent presentation by the company's human resource officer were good experiences.

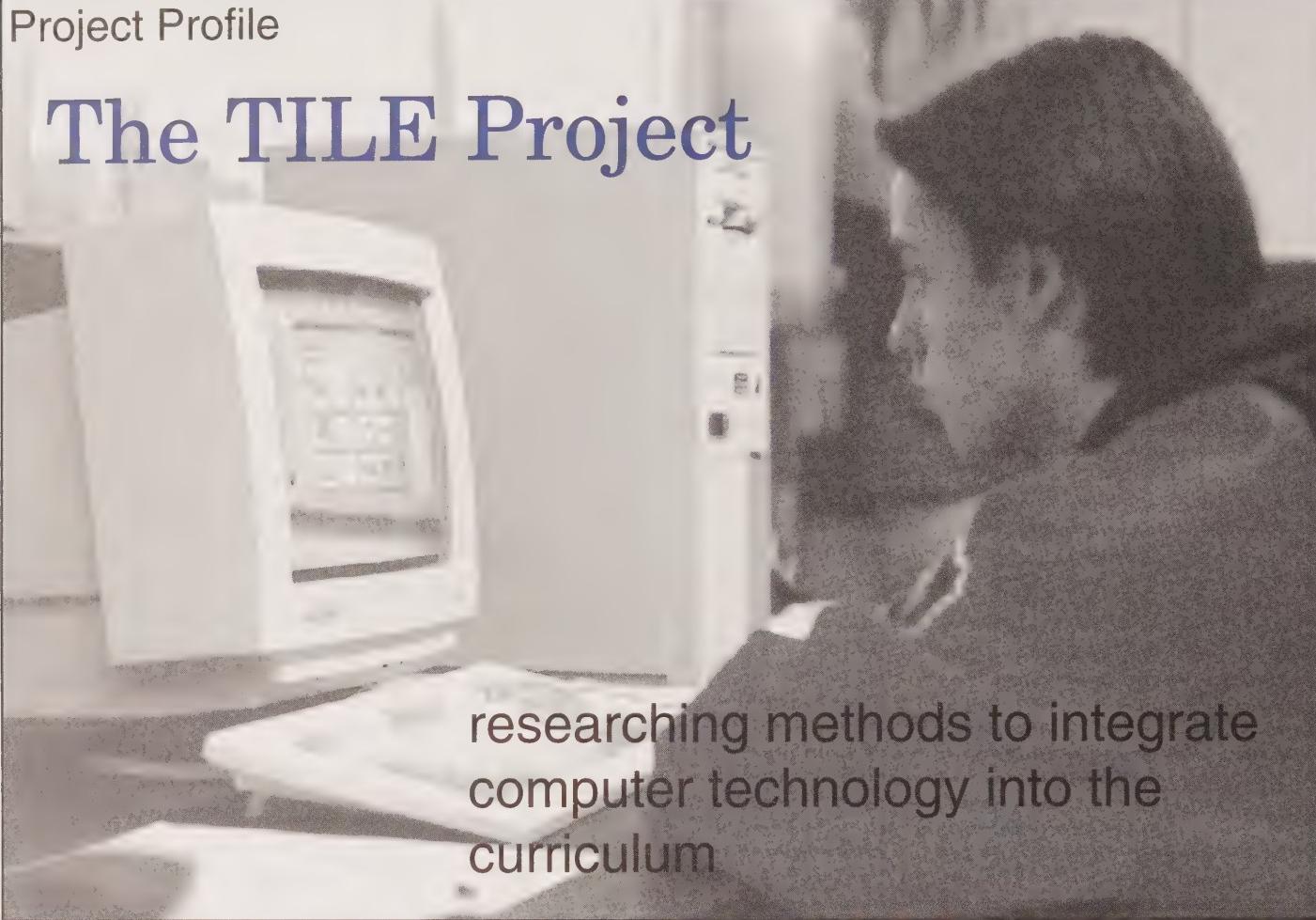
In this light, educators can do four things to collaborate with outside organizations (Mann, 1993). First, educators can encourage business leaders to influence educational policy. Second, educators can actively participate in the technological and strategic changes occurring within industry. Third, educators can lobby to support industrial initiatives within our own educational computing facilities. Fourth, educators can abandon discrete skills in favour of strategic objectives that promote team-based, critical thinking activity.

Incremental policy is the best of the three approaches because of its reliance on knowledgeable people over software innovation. This approach accounts for differences between general and special-purpose computing factors for graduate and undergraduate students. Incrementalism can be implemented by administrators with a commitment to respond to business and government concerns about computing policy for education. Ω

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The TILE Project



researching methods to integrate computer technology into the curriculum

by
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and
Sharon Vivian

A year-long research project has recently concluded, producing significant information on the integration of computer technology in our schools.

Technology In Learning Environments (TILE) is a project that was undertaken by the Department of Education and Training to develop a strategic plan for the integration of information technology into the teaching/learning environment, the curriculum development process, and the learning resource management process of the K-12 education system.

The Department received information on instructional goals, curriculum development, and resource management for areas where technology can be applied. Project researchers assessed the effectiveness of technology currently used in the

province's schools and offered a concise implementation strategy outlining possible projects, pilots and policies.

Currently, much of the technology in classrooms is used to reinforce traditional methods of teaching and learning. It is expected to function according to the relationships that existed in the classroom before its introduction. The committee's research indicates that technology integration is more complex than simply having computers available in classrooms. Maximizing the use of technology requires a comprehensive and synchronized approach.

A technologically-enriched curriculum creates an environment conducive to active learning. Students share the responsibility for how and what they learn both individually and

A technologically-enriched curriculum creates an environment conducive to active learning.

Students share the responsibility for how and what they learn both individually and in groups.

in groups. The home, school and community merge, enabling students, parents, and teachers to collaborate in the management of learning.

Technology integration is accompanied by changing roles and approaches to teaching and learning. Students become independent and collaborative problem solvers, communicators, record keepers and learners (Tierney et al., 1992). They develop two roles, learner and expert resource. Student-centred instruction, collaboration, team teaching, interdisciplinary project-based instruction and individually-paced instruction become more common. These learning conditions are linked to empowerment and are often prevalent in classrooms with greater access to computer technology. Computers are seen as a symbol of change and license for experimentation.

Computer-based instruction is more motivating than traditional methods of instruction for students of all ages and ability levels. Students become actively engaged in the learning process. They make mistakes without embarrassment, receive immediate feedback, and have a feeling of control. The use of computer-based technologies has been shown to

raise self-esteem among users and reduce learner anxiety.

Technology can be used effectively to accommodate multiple learning styles. Research suggests that students with different learning styles benefit from multimedia products. Simulations, hypermedia, video and voice annotations offer alternate modes of instruction and evaluation. Computer-based technologies can administer individualized lesson sequences that branch and remediate according to a student's unique needs. They can quickly and automatically track progress, perform data analysis and generate reports. This may free the teacher to provide individual attention, and evaluate and improve the learning environment. Computer-based tools enable teachers to quickly generate individualized communications to parents, create programs and lesson plans, and select instructional resources from an extensive resource database.

Technology has the power to equalize learning opportunities. Through distance education, students and educators can be offered learning opportunities unavailable locally. Students can initiate long-term, online discussions with experts and

develop mentor relationships. Learning networks can transform our understanding of the school as a physical place. Students can have access to the same technical resources as industry, placing what they learn in a real-world context. Technology provides students with a diverse audience. This changes the purpose for writing and offers new sources of feedback (Peck & Dorricott, 1994).

Working in a small group at the computer can enhance learning. Students provide feedback and reinforcement to one another as they go about solving problems cooperatively. Students share written work more frequently when they are able to generate legible text on screen or on print-out (Hiebart, Quellmalz and Vogel, 1989).

Current technologies address the weakness of a single sequence path and offer multiple paths to learning. Technology provides an entry point to content areas that might otherwise be inaccessible until much later along an academic path. For example, primary students may become contributors to scientific research by tracking the migration patterns of Canada geese.

Until now, integration has occurred through sporadic district, school and teacher initiatives. However, these types of changes in learning environment are attainable on a provincial scale. Appropriate professional development, adequate resources, supportive administration, technical support and a risk-taking school climate are all essential to the long-term success of technology integrated learning environments.

Teaching is an intensely personal profession. It involves continuous decision-making in the development, interpretation and modification of curriculum. Individual teachers have their own subjective views about education constructed from knowledge

about teaching and learning, and from beliefs about children. These have an impact on the way educators teach and how schools function. School culture is described as the set of beliefs and values held in common by those who work within the school setting. These shared values and beliefs form the basis for judging behaviour, ethics, and innovation and can promote or inhibit change within the school. Effective, long-term technology integration requires systematic change at this level.

Technology has the potential to be a primary agent for educational reform. This will occur only if professional development is given priority. If educators are provided adequate, appropriate in-service to use technology effectively in their classrooms, positive change can result.

Support is the key to successful integration. Teachers need administrators/leaders who understand that the integration of technology into classroom curricula is a complex process. This requires administrators/leaders who invite change and collaboration among teachers and are not afraid to risk disruption or even short-term failure in the interest of innovation and reform. Establishing solid partnerships with stakeholders will be an important part of the implementation process. A

cooperative effort will ensure the implementation of technology proceeds wisely, providing the best possible opportunities for our children. This kind of change occurs along a continuum, enabling educators to choose progressive strategies. When all educators are committed to moving along this path, the school culture will change. Ω

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Managing Human Resource Development at the Community Level

a local company develops a model and materials for staff training and organizational development for rural and native communities

Restructuring the delivery of health, social services and education is creating new challenges in staff training. In rural areas of Newfoundland and Labrador, innovative training technologies are needed to minimize the impact of geographic isolation. In recent years, distance education and workplace learning have provided rural residents with access to quality training. The opportunity to enhance the skills and knowledge of those who work in public service agencies is greatly improved by new educational technologies. However, the first task is to identify the organizational and staff development needs of a community agency through a comprehensive assessment involving all community members.

The Institute for Human Resource Development (IHRD) is a Newfoundland company formed in 1989 to assist individuals, organizations, and families develop strategies

to enhance local staff competence for the delivery of social services. The IHRD directors, Rick Browning and Rick Morris, are currently creating and testing a model for assessing, designing, and implementing organizational development and staff training strategies for workers in health, social services, and education specifically in rural, native communities. Browning and Morris believe that such a model, once proven effective, could be applied in similar settings with appropriate adjustments to accommodate each community.

The pilot community group is the Miawpukek First Nation Band located on the south coast of Newfoundland. The Band has a population of 1,269. The focus of the project is Conne River, a MicMac community with a population of 645. The Band has been under a Health and Social Service Transfer Agreement during the past two and one half years. This agreement includes the transfer of funds for

a full range of health and social services to be administered and delivered by the local Band Council. The Transfer Agreement provides the Council with more autonomy to identify its local needs and develop programs to meet these specific needs. The Agreement is delivered through the Conne River Health and Social Services clinic.

Aside from the full range of medical services, the clinic provides child and family services, home care and nutrition programs, a family resource centre, a self-esteem program for children, and job placement counselling. The staff members working in these programs have varying backgrounds and have a particular interest in building their skills and qualifications. One of the unique features of this clinic is its interrelated approach to providing health and social service programs. For example, a woman who attends the clinic to be treated for an injury resulting from family violence

will also have immediate access to personnel who provide support services to victims of family violence. This integrated approach to services reduces the administrative barriers that often exist between various public services. At the same time, it creates a need for a variety of organizational strategies and a broader range of skills in order for staff to deliver these programs. The Institute for Human Resource Development, through this pilot project, hopes to identify the strategies and types of training needed by the clinic's staff members.

Browning and Morris began with an extensive review of current literature on the process of needs assessment in rural and native communities. This was followed by consultation with local community groups, Band Council members, health, education, and social services workers in the region. The needs assessment in Conne River was completed by the end of October, 1994. The staff of IHRD will provide the community with a comprehensive report containing the results of the needs assessment. In addition, a model for design

and delivery of services is being developed. The report will recommend ways in which existing technologies such as distance education can be used to meet specific training needs such as computer training. It will also suggest ways in which innovative organizational and training curricula relevant to the integration of public services can be delivered to interested groups within the community. The types of training recommended range from two-day workshops to certificate programs. The responsibility for determining the priorities of the needs of the community is left to local people.

The long-term goal of the Institute for Human Resource Development in this project is to develop a comprehensive handbook for integrating public services in native and rural settings across the province and the rest of Canada. Rick Morris believes that the rural community is the ideal setting for the shared approach to providing public services. "Instead of finding themselves buried in referrals from one agency to another, individuals and their families become the priority. At the same

time, staff members no longer feel they are simply treating symptoms." Morris gives an example of bringing educators and other public service consultants together in a collaborative effort. "A primary school teacher who is focusing on ways to build self-esteem in students will likely develop a more effective curriculum having consulted with colleagues in other areas, such as family counselling and alcohol/drug addiction personnel."

This project will be piloted with the assistance of the director of the Health and Social Services clinic, Terrence Hickey and his staff. IHRD directors will then work on a marketing strategy to make the model available to potential users elsewhere in the province and the country. Ω

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The Amelia Joe Building, site of the Conne River Health and Service Clinic

Cases of Teaching and Learning



Finding a model for continuous progress in primary school classrooms

In Adjusting the Course: Part II, the government of Newfoundland and Labrador recommends the reorganization of primary education on the basis of continuous progress. This would effectively eliminate the traditional grade system and allow pupils to progress at their own pace. A change from the traditional system of vertical organization of schools will not be easy to achieve. Research clearly shows that continuous progress education cannot simply be mandated, rather it will require a sustained deliberative analysis of the new approach and its implications for practice.

Members of the Faculty of Education at Memorial University are currently addressing some of the issues involved in implementing continuous progress education. A project proposed by Dr. Frank Cramm and Dr. Roy Kelleher will eventually lead to the production of a series of video-

tapes designed to foster reflective analysis requisite to effective implementation of the proposed innovation.

The objective of this project is the development of three 'cases' of teaching and learning in classrooms organized along continuous progress lines. Each case will be documented through a variety of perspectives. The first product will be a half-hour videotape detailing the planning process and teaching activities of a teacher or team of teachers during a period of one week. A second videotape will depict the experiences of pupils in that classroom during the same one-week period. The package will also include observer accounts of the events of the week, samples of teachers' plans, sample of pupils' materials, and excerpts from interviews with teachers and pupils. Together these materials will provide a rich description of each of the cases.

The package of materials could serve as a basis for teacher in-service, professional development and school improvement programs. As well, the materials may be delivered to remote sites through a teleconferencing program. The cases would also be invaluable to the Faculty of Education in preparing graduates for the realities of teaching in schools where continuous learning policy has been implemented.

This project is in its initial stage during the fall of 1994. The proponents are identifying schools in the province which could serve as sites for the cases. However, Cramm and Kelleher believe it is first necessary to come to terms with the meaning of continuous progress and its practical implications for Newfoundland and Labrador schools. "There are many questions which need to be asked and answered before individual schools can implement this type of organization." Cramm and Kelleher believe this project will raise some of those questions.

Nongradedness and continuous progress are elusive concepts. Recent research findings distinguish several methods of grouping students for effective nongraded schooling (Gutiérrez and Slavin, 1993). For example, students can be grouped according to performance level in one subject only. For the teaching of that subject, grade level placements and the chronological ages of pupils are ignored.

A comprehensive nongraded plan places students together for two or more subjects. It incorporates flexible, multi-aged grouping and continuous progress; however, it does not emphasize the individualization of instruction.

A third model of nongraded education, while grouping students homogeneously in subject areas, emphasizes individualized teaching by

utilizing learning stations, activity packages and programmed instruction. This is specifically designed for small groups of students.

Individually-guided education, a fourth model of nongradedness, involves the development of an individual education plan for each student combined with constant assessment to determine a pupil's continuing placement. This method makes extensive use of teacher and peer-tutoring, team-teaching and learning stations.

In addition to several models for nongraded education, researchers have identified thirty-six principles characteristic of the approach and hundreds of behavioral indicators. Research findings indicate that the concept of nongraded/continuous education can mean many things to many people. It is as difficult to identify as it is to implement. For these reasons, the faculty members who have initiated the 'case' project have decided to use one basic criterion for their project. A case of continuous progress education is identified as a situation in which pupils are taught according to their levels of academic performance, not their chronological ages or grades. There are many approaches to teaching in this type of organization. This project will attempt to document and study three such approaches.

The move to primary education on a continuous progress basis raises many questions. First, it is common practice to inextricably link the concepts of 'nongradedness' and 'continuous progress'. This project will include an extensive examination of these concepts, distinguishing their differences and providing an understanding of the variety of instructional approaches suited to the implementation of the proposed change.

Secondly, providing a set of 'cases' on continuous progress instruction

will depend on the availability of these types of instruction in the province's school system. By producing a set of pedagogical cases, this project will contribute to the materials available for teacher in-service and teacher pre-service.

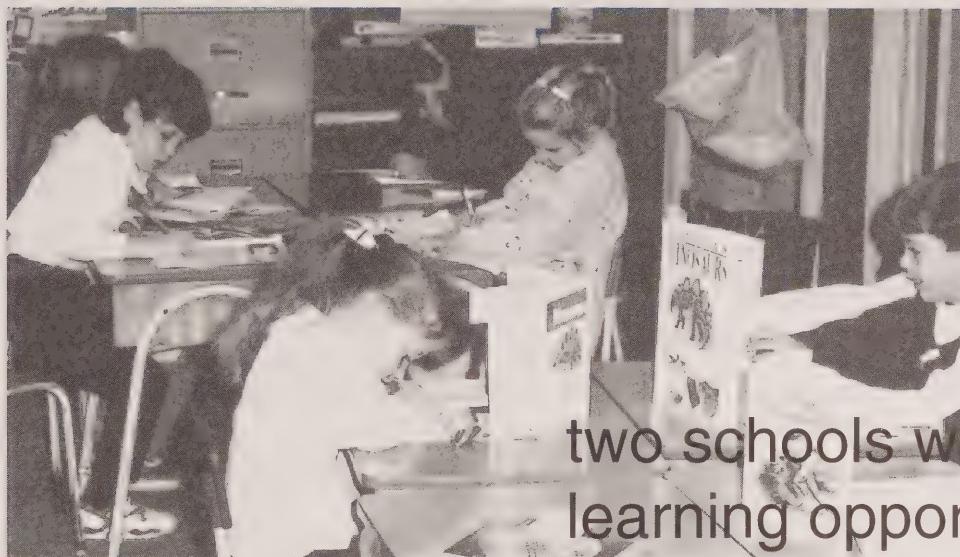
Furthermore, the cases offer an opportunity to examine how teachers respond to innovative ideas which may be at variance with their current beliefs and practices. This set of 'cases' will show how more than conventional instructional teaching methods and administrative organization will be needed to implement the proposed innovation. This project is designed to meld these three major considerations by producing materials specifically designed to enable teachers to explore deeply held theories and beliefs about certain aspects of schooling. Hopefully, this will be accomplished through examination of alternative cases of teaching in continuous progress contexts. Ω

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A New Look At the Multi-grade Classroom



two schools work to improve learning opportunities in the multi-grade classroom

by
Dr. Patricia Canning
and
Dr. Elizabeth Strong

In recent years, declining enrolment has led to a resurgence in multi-grade groupings in schools throughout North America. While there have always been many small schools in Newfoundland and Labrador in which multi-grade classrooms were common, this number is expected to increase in the immediate future. The Royal Commission on Education recognized this and highlighted the need to design curricula and instructional strategies appropriate for multi-grade environments.

The Avalon Consolidated School Board, St. John's, due to decreasing enrolments in some of its elementary schools, has recently introduced multi-grade classrooms. The Board was determined to provide a multi-grade environment rather than mere-

ly teaching different grades in the same classroom. It also recognized that many parents and teachers had serious reservations about having children in classrooms with more than one grade. This attitude was due in no small way to their memories of their own schooling in which many grades were taught in the same classroom.

To address people's concerns and to ensure a well-developed multi-grade curricula, the Board initiated a collaborative project with the Faculty of Education, Memorial University of Newfoundland. The purposes of this project are: (i) to describe the process of developing multi-grade curricula and the essential components of such curricula for the primary grades, (ii) to monitor the effects of multi-grade



Elaine Spurrell works with her class of grade ones and twos at Pouch Cove Elementary

curricula on the children, parents and teachers in the Avalon Consolidated School Board's Pouch Cove Elementary School, and (iii) to delineate and make available to school boards in Newfoundland and other provinces the process of adapting the present curricula in order to provide optimal learning environments for all children.

Multi-grade classrooms were introduced to Pouch Cove Elementary School in the fall of 1993. Presently, the children in grades one, two, and three are divided into two classes, a grade one/two class and a two/three class. The children in grades four to six are divided into a grade four/five class and a grade five/six class. They are divided into groups of equal size and placed according to age. The youngest grade two children are grouped with the grade ones and the youngest grade fives are grouped with the grade fours.

The Pouch Cove teachers and the Board co-ordinators, who are designing the multi-grade curricula, are organizing the curriculum objectives,

as stated by the Department of Education and Training, into a Year 1,2,3 primary program instead of Grades 1,2,3 programs. The objectives for each year are the basis on which a number of resource-based learning units are developed. As Elaine Spurrell, one of the multi-grade teachers, notes, the "resource-based learning approach is essential to the program. The units we develop can be presented to the entire class. Over the three years the children will have experienced all aspects of the graded curricula."

Although the children will perform differently at different ages, Beth Noseworthy, another multi-grade teacher, states that "we have different expectations for the children at different levels as they progress through the resource-based units. Using these units gives us the flexibility we need to accommodate these differences." Even though the development of the resource-based units requires much time, the teachers agree that this development time is extremely important and well worth the effort.

In order to understand the implementation and the effects of different approaches to curricula, children, parents and teachers of a school with single-grade classrooms, Beachy Cove Elementary, have been selected to serve as a common basis for comparison. The effects of the curricula on the children's academic performance, aspects of their social and emotional development, and their attitudes towards school will be assessed. In addition, the teachers' attitudes towards teaching and learning, and the parents' involvement in the school and their opinions about the different learning environments will be examined.

Curricular development, implementation and evaluation is an extensive, continuous process. Over

We have different expectations for students at different levels as they progress through the resource-based units. Using these units gives us the flexibility we need to accommodate these differences."

collected on specific curricular materials and instructional strategies. The children's achievement will be determined in relationship to the goals and instructional objectives intended, the curriculum content, the learning resources, and actual instructional strategies used.

Once developed and assessed, the curricula will be made available to others in the province and elsewhere in Canada. The collaborative process of curricular development and implementation will serve also as a model for other attempts to improve teaching and learning in the multi-grade classroom. The project is valuable for what will be learned about the development and implementation of the curricula in the multi-grade classroom, as well as the implementation of curricula in the single-grade classroom.

While the goals of education

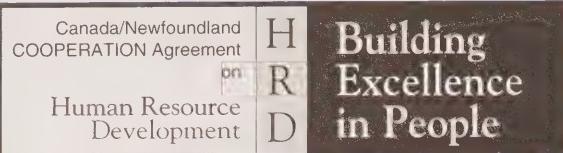
remain intact, the means of achieving these goals are changing. Teachers need professional preparation for teaching in the multi-grade environment. Rather than simply applying curricular and instructional strategies of the single-grade classroom, they have to be knowledgeable about alternative teaching and learning strategies which capitalize on the features of the multi-grade classroom. Ω

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COOPERATION



The Cooperation Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the need of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community education and reward high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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Apprenticeship Redefined

In 1883 Coady's Forge first opened in St. John's. For over one-hundred years four generations of Coadys have learned the art of blacksmithing from their fathers and then passed the knowledge to their sons. At 79 years of age, William Coady still works at the forge. He passes the time while he waits for the iron to heat by reminiscing and talking about the changes he has witnessed. When the iron is ready, all conversation stops as he hammers the reddened metal into shape, speaking only to remind his assistant that the iron should not be over pounded.

The relationship of Master and Apprentice is an old one. Medieval craft guilds were established for shoemakers, weavers, wool dryers, and goldsmiths to set prices and wages, regulate work hours and supervise the quality of goods produced. By the late 1200s, craft guilds began restricting membership to prevent an over supply of goods.

In order for a man to become a craftsman he would first become an apprentice, usually at the age of seven or eight. He would learn his skills from a craftsman who was a member of the guild. After 3 to 12 years, the apprentice became a journeyman and earned wages by working for a master craftsman. If the journeyman produced work at the high standard set

by the guild, he would obtain the title of master craftsman.

This system of apprenticeship served society well for centuries but how it will meet the needs of the next century is an issue of significant concern for individuals in human resource development.

Looking to traditional answers to modern problems can be counterproductive unless we are absolutely sure what we are trying to find. Technology has transformed the blacksmith's hammer into circuitry, and the flame of the forge into software. We are not going to regress to the technology we have left behind. Perhaps then, what we are looking for is the quality of the relationship that existed between the master and his apprentice. It is a unique partnership that tempers the energy and passion of youth with the patience and wisdom that can come with maturity. Perhaps we will find the qualities we seek as we attempt to redefine this unique partnership.

This edition of Prospects explores some of the new approaches that have been taken to this old idea. Barry Roberts and Walter Smith have written articles dealing with the administration of these models. We will explore co-operative education models used in the province's high schools and models used at Memorial

University. In one article we investigate recent trends in medical education and in another, review the internship program offered by the Faculty of Education at Memorial University.

The format of the journal has expanded to 32 pages. We will be publishing three new columns we hope our readers will find useful. **Directory Assistance** will be dedicated to providing information about interesting sites on the internet for educators. The first instalment is written by Wendy King and focuses on the primary school level. George Haché is authoring our column **Technology and Education**. The column called **Industry News** will highlight significant events or issues relevant to the human resource development industry.

The Winter 1995 issue of Prospects will profile the COOPERATION Agreement on Human Resource Development and its contribution to education and economic renewal. Please send submissions on these or other topics relevant to human resource development to the editors at the address on the last page. Your submissions will be carefully considered for publication.

Trudi Johnson
Albert Johnson (editors)

DIRECTORY ASSISTANCE

What's "Primary" on the Web

some points of interest
on the World-Wide-Web
for primary teachers

by
Wendy King

The World-Wide-Web has fast surpassed all other areas of the net as the place to look for curriculum support material and professional resources. However, "what's out there" can be pretty overwhelming, especially for a novice internet user. There are numerous places to look for material and resources appropriate for the Primary school student and teacher and this article should be considered only an introduction.

There are many different ways that Primary teachers can make use of the resources on the Web. There are sites that offer material to directly support or supplement topics and ideas in the curriculum. There are sites that are specifically aimed at children and have all kinds of "cool" stuff. There are sites that offer professional support for teachers, and, last but not least, there are sites created

by schools and students themselves. Many, if not all, of the sites mentioned in this article are available through the STEM~Net Primary homepage.

Sites created with children in mind range from sites based on popular children's television programs such as Theodore Tugboat to virtual museums such as The Hands on Children's Museum (<http://www.wln.com/~deltapac/hocm.html>). At the Theodore Tugboat site (<http://www.cochran.com/theosite/Webmast.html>), there are colouring pages to download and an interactive story where the child can make choices that affect the outcome of the story. The Bill Nye the Science Guy (<http://www.seanet.com/Vendors/billnye/nyelabs.html>) site allows you to download sound clips from the show and send email directly

to Bill himself. For the sports fan there is a site dedicated to the upcoming Atlanta Olympics (<http://www.atlanta.olympic.org>). Check out the Canadian Kid's Homepage (<http://www.onramp.ca/~lowens/107kids.html>). Kids can also use the net to find keypals (the new term for penpals) (<http://www.comenius.com/keypal/index.html>) or share their writing through a Junior Authors' Club (<http://mfusion.com/litebulb/this/chiboos/chiboos.html>).

Teachers will also find a great deal on the Web to support particular topics or curriculum areas. There are whale sites (<http://www.compusult.nf.ca/nfld/other/whales/whales.html>), dinosaur sites (<http://ucmp1.berkeley.edu/exhibittext/cladecham.html>), a penguin site (<http://www.sas.upenn.edu/~kwelch/penguin.html>) as well as broader areas such as Elementary Science this Week (<http://lmewww.mankato.msus.edu/i/elec.sci.html>) which is an on-line magazine offering ideas for teaching science based around a specific topic.

There are also sites for teachers which offer support and resources for and about teaching in general. One of the best sites for all areas, but especially Language Arts, is the Children's Literature Web Site (<http://www.ucalgary.ca/~dkbrown/index.html>). It has numerous links to other sites as well. Classroom Connect on the Web (<http://www.wentworth.com>) is an on-line journal about teaching and learning in the information age.

Web 66 (<http://web66.coled.umn.edu/schools.html>) offers the most comprehensive list of other schools (continued WEB on page 4)

Taking a Hard Look At Technology in Education



by
George Haché

At a recent gathering of educators, I was intrigued by an argument that computers, like television, video recorders, and many other twentieth century innovations may not have any appreciable effect on learning. You can imagine that comparing computer technology to many other innovations of the past that had captured teachers' imaginations, only to quickly fade away, is a view that attracts a fair amount of attention. Was this yet another challenge for those many educators who advocate investing in emerging technology as a means of improving the quality of education? Was it a lament for the more traditional practices used in education? Or was it expression weighted by the frustration of not knowing exactly what the expanding technology is indeed contributing?

A myriad of views regarding the

effect that technology is having in Canadian schools surfaced this past summer. These were identified in a series of project reports, views of individual experts, and in news articles. The Guide to Education inclusion published in "The Globe and Mail" on Thursday, August 17, 1995, was twelve pages of interviews, articles, and reviews that describe current issues, practices and trends. It projects views of the future and predicts a major impact on education. More recently, (Tuesday, September 12, 1995), the same daily included yet another eighteen page insert that describes recent and future telecommunications development in the Report on Telecommunications. Check out the September 1995 issue of "Scientific American" (150th Anniversary issue) that is devoted to key technologies for the 21st century

before forming an opinion of whether technology has potential to change education.

Whether any new technology contributes to learning may best be defined in the context of what any individual teacher believes is the educational window available in which to teach. Technology placed in classrooms may have negligible effects in instances where teachers are unable or unwilling to incorporate its use, and teaching can continue as it always has, centrally focused on the interaction between the educator and student.

Regardless of teachers' prevailing view, the influence of new technology in classrooms is evident. Today, all printed literature is developed with the use of microprocessors, photocopiers, digital recreations and enhancement, laser printers and sophisticated information retrieval systems. It is further enhanced by advances in telecommunications, transportation, and even management systems that all utilize sophisticated technology to expedite the development and delivery of educational products, and more. With the speed of computers doubling about every eighteen months and continued expansion in microprocessor technology, one only wonders what innovations will be forthcoming. Is the field approaching the limits of miniaturization where photolithographic methods will be taxed to their limits of size and impede further development of more complex and compact circuits? Or will developments in electron beam technology and new materials continue to spur the rapid microprocessor evolution we have wit-

nessed in recent decades? And will this evolution continue to produce products that tantalize educators?

Acknowledging that a growing number of Canadians have invested in home personal computers, Rogers Cable systems, IBM Canada, Microsoft Canada and Intel Canada have joined forces to expand broad band network technology to respond to the increase in demand for high speed services anticipated in Canadian businesses, homes, and institutions. Beyond this, wireless communications promises to be the next daunting technology slated for introduction in 1997. Wireless technology will enable the deployment of personal communication services (PCS) devices that will include electronic mail paging services, voice transmission, and notebook computers all in a package (Goron Arnaut, *Globe and Mail*, C-2). Will educators be able to respond?

All evidence points to more sophisticated computer systems entering the home. There is an intensified challenge for educators to focus on the expanding possibilities this technology can have on teaching and learning, a daunting future for those who don't know the technology. The problem seems to be getting teachers on board. Rather than lamenting that too much useless time is spent on word processing or meaningless computer software, teachers need to focus creative time and insight on issues related to the manner, amount of educational and quality of content that is used in education and training.

Questions remain as to whether projects like School-Net and linking schools to the Internet are useful. As well, programs that encourage teachers to design better activities need to be considered. Can we learn from those examples that use recent university graduates to in-service teachers with the new technology

(Queen's), or can the New Brunswick K-12 on-line credit courses structure (first on-line virtual campus) provide useful evidence? Can on-line university programs such as those offered by several American institutions present a useful model for regional post-secondary educators?

With the present interest in this technology, the future certainly suggests an expansion of the technology in schools. There may be doubt whether the technology is adding value to the learning process but there is no doubt that it is adding to the base of information about learning with new technology. Ω

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(WEB continued from page 2)
on the web and is a great place to start looking for just about anything to do with education.

One other use of the Web that is just evolving is to run on-line projects. Project Groundhog was developed here in Newfoundland and Labrador and will be "going national" this February. Project Groundhog involves students keeping track of the weather for the six weeks following Groundhog day to see if the groundhog is an accurate predictor of the weather. The data collected is shared with other participating schools. To learn more, check out the Project Groundhog homepage (<http://www.stemnet.nf.ca/~bjameson/gh1.html>).

This is only a taste of what's out there. If you are looking for a place to start, why not try the STEM~Net Primary homepage? You can get there from the STEM~Net homepage, then go to Curriculum and from there to Primary. Once you start surfing on your own, please contact me if you find a site you think should be linked into the Primary homepage. Ω

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Apprenticeship

re-working an old idea for a modern age



by
Barry Roberts

The challenges facing Canadians as we approach the twenty-first century are well documented. Canadian industry will be in a new millennium in five years, one characterized by global competitiveness, a profound shift in attitudes toward work and training, innovation through the application of technology and investment in people. Canada has entered the post-industrial age of information, the nature of which few people understand and the impact of which few Canadians will escape. In an information society, the development of human resources will become paramount. Job skills will be replaced by employability skills and short-term skill development replaced by life-long learning.

Training will play a significant role in building and maintaining Canada's competitive workforce.

However, industry is concerned about Canada's ability to produce highly qualified tradespeople to meet the needs of tomorrow's labour market. The flow of skilled tradespeople from Europe, characteristic of the 1960s and 1970s, has stopped. This void must be filled in part through an investment in apprenticeship training.

Apprenticeship is a proven way to learn new skills and build a successful career. Apprenticeship involves a three-way partnership: a worker who wants to learn, an employer who needs skilled employees and is willing to assume the cost of workplace training, and the Institutional and Industrial Education Division of the Department of Education and Training which registers the Contract of Apprenticeship and makes sure that up-to-date training standards are

in place to meet the needs of apprentices and employers. About ninety percent of an apprentice's time is spent on the job, gaining hands-on experience under the guidance of certified skilled workers. The remainder is spent at a college or technical institute. In Newfoundland and Labrador, apprenticeship generally takes between four and five years to complete, depending on the occupation.

In most European countries, apprenticeship is viewed as an extension of formal education more than an employment training program. In North America, the emphasis has been on providing a level of service to industry. Currently, there are approximately 122,000 apprentices in Canada (0.9% of the workforce) registered in one hundred and sixty-nine occupations. By contrast, in Germany there are 1.8 million (4.5% of the workforce) participating in four hundred and eighty-eight apprenticeable occupations. Some of the major weaknesses of the apprenticeship system in Canada include the inability to attract school leavers, an exorbitant cost (almost twice that of Germany) and a dropout rate of approximately forty percent. In Newfoundland and Labrador, as in most other provinces of Canada, those who participate in the apprenticeable trades are almost exclusively white males. Less than twenty percent of all apprentices and journeypersons are female.

The Canadian apprenticeship system has come under considerable scrutiny over the past several years. A study by the Provincial Apprenticeship Board in British Columbia, in 1984, calls for a more flexible system of training that would include alternatives to the traditional structured, supervised and regulated learning processes of formal apprenticeship. In Ontario, the Premier's Council's 1990 report "People and Skills in the New Global Economy"

notes an ailing apprenticeship system. The 1993 New Brunswick report "To Live and Learn: The Challenges of Education and Training" identifies the failure of the system to respond to the needs of new and emerging industries. The report states that the apprenticeship system required a major overhaul. In 1994, a report released by the Provincial Apprenticeship Board of Newfoundland and Labrador reports similar findings. Late entry, downsizing of industries, pressures to produce multi-skilled craft persons, and the need for life-long learning were among the major issues that must be addressed if apprenticeship is to build the type of labour force that Newfoundland and Labrador requires to compete in the international marketplace.

On the global front, the November 1992 issue of *The Economist* notes that the long coveted German approach to apprenticeship has recently encountered difficult times. Much of the criticism has been attributed to the importance Germany has placed on specific practical knowledge which can become quickly outdated. Denmark, by contrast, has experienced greater success by adapting the German system to reflect more emphasis on theory than skills training. Training and apprenticeship systems in other countries are products of particular cultural and economic circumstances and seldom can be successfully imported without modifications to suit local conditions.

Apprenticeship training must shed its image of being a program for underachievers in yesterday's occupations. It should embrace emerging opportunities such as those identified by the Economic Recovery Commission as new possibilities for growth. Although the apprenticeship training model has contributed significantly to providing a highly qualified

workforce, many question its structural capability of continuing to do so. Tom Watson (1986) in an article in the Canadian Vocational Association Journal states that "apprenticeship per se should now be dragged, if need be, screaming and protesting into a new era if we are to face the next decade with any degree of equanimity."

In recent years, large industries have been replaced by small employers. What was once a culture of true trainers for apprentices has today evolved into small specialized firms resulting in a limited range of experiences. This inability to provide a full range of training is having a negative impact on the quality of trades training. For those apprentices who find willing employers capable of providing a full range of training, the absence of job opportunities after journeyperson status is achieved, presents a different challenge. Often apprentices will choose to remain at level three or four for a long period of time rather than proceed to journeyperson and find themselves unemployed.

Several alternatives to the conventional apprenticeship model have been proposed. The current system could be modified to reflect more extensive use of a modular approach to learning with more time spent in institutional settings and less time on the job. This would provide for a more flexible schedule, reducing the difficulties in assembling groups of apprentices and making it easier for individuals to coordinate their training and work schedules.

Another approach that would require a departure from conventional thinking would be modeled after existing co-op programs in other areas of training. Such a model would see the majority of training done by the educational institutions with shorter industrial experiences used to reinforce the institutional training. Job

"Apprenticeship per se should now be dragged, if need be, screaming and protesting into a new era if we are to face the next decade with any degree of equanimity."

experience would take place under the supervision of the institution. Such an approach would be closer to the continental European model in that it makes apprenticeship more a part of the education system than the employment system.

Much debate has occurred over the past several years regarding the virtue of developing an internship system for trades training. Such a system would require that all the institutional training be given during a two year period at the beginning of the training process. This would be followed by an extensive industrial assignment.

The future role for industry and training institutions in the development of our tradespersons is not clear. There are those who could argue for full institutional training with little or no industrial experience. Such is the case now with many of the technology programs. Others argue just as convincingly that we should return to the original concept of trades training being industry specific, and hence, should be the responsibility of the industries concerned.

Whatever the approach, the status quo will not get us where we want to go. We cannot, however, lose sight of the value of the system. Nowhere, in any of the reports cited, is there a

call for abandonment of the system. The focus must be on improvements. The Interprovincial "Red Seal" Standards program has become a flagship for Canada in enhancing workforce mobility and demonstrating to the rest of the world how provinces and territories as diverse as those found in Canada can reach agreement on national standards.

The apprenticeship system is based on sound principles. This is evidenced by its survival over such a long period of time. We must build on the foundation of apprenticeship to include more co-operative approaches to training, certified work experience and distance education technology. We must expand our scope beyond that of traditional occupations, move from time-referenced to competency-based programs and include more generic skills training.

During the past two years, a comprehensive review of apprenticeship training in Newfoundland and Labrador was undertaken. The process included extensive consultations with stakeholders across the province. The resulting report, "Apprenticeship Training: Now and the Future", recognizes the need for changes in the way apprenticeship training is organized and delivered. It strongly recommends that the focus of future

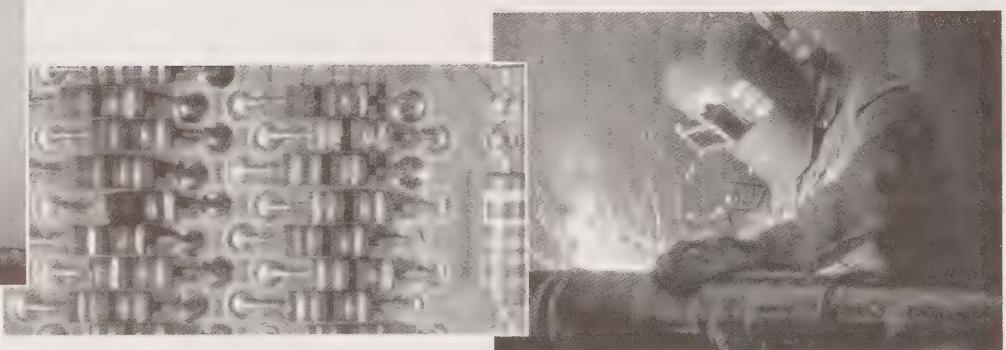
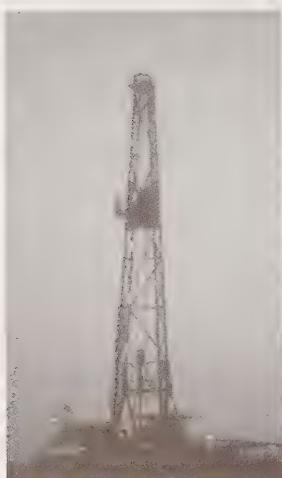
models of training must be on the apprentice. The report acknowledges that no one model will meet the requirements of emerging trades in an environment characterized by changing economic and corporate climate. Changes to the system must be supported by relevant legislative changes. The current Apprenticeship Act is outdated and needs to be revised. As with any report, the true test of its value will be in the action taken on the recommendations.

Business and industry must work in partnership with the Department of Education and Training and educational institutions to delineate the roles and responsibilities of each in providing for a highly trained workforce for the next century. Whatever the future face of apprenticeship for Newfoundland and Labrador, it must be dynamic and reflect the realities of a modern society, while contributing to the successful promotion of the apprentice as a significant player in the future economic development of the province. Ω

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Developing Curricula For Training In the Trades

articulation — a new approach



by
Walter Smith

The 1990 White Paper on post-secondary education, "Equality, Excellence and Efficiency: A Post-Secondary Education Agenda for the Future", outlines the intention of the government of Newfoundland and Labrador to increase transferability among post-secondary education courses and training programs. Over the past six years, considerable effort has been made to harmonize these two areas. Trades articulation is part of this ongoing process. However, there is a special challenge associated with the articulation of programs based on experiential learning. Because of the holistic nature of experiential learning, it is necessary to retain comprehensiveness while identifying the specific common features that make harmonization possible.

Experiential learning exists in

many formats. Cooperative education, apprenticeship, studio experience, service learning and internship are some of the more familiar designations associated with particular occupations. However, shop and laboratory work, on-the-job training, workplace learning, self-directed learning and practicums are also examples of learning through experience. To develop a process for the articulation of trades programs, it was necessary to investigate the broader experiential learning picture and its relationship to conventional school-based learning.

Experiential learning is often perceived as an extension of information-based education or a separate activity where previously learned information is applied. In reality, the acquisition and retention of knowledge is an integral part of experiential learning.

Because information-based programs exist in a course format, harmonization is a straightforward process of aligning course objectives.

Information-based courses tend to be collections of learning objectives that often do not have a meaningful application. On the other hand, experiential learning programs preserve their meaningful application at the expense of becoming fragmented. Therefore, harmonization of those programs cannot be achieved using the established information-based articulation process. It has to be done within a classification system which retains the comprehensive characteristic.

Consequently, the first step in the harmonization of trades programs is to organize the programs into "comprehensive courses."

Comprehensive courses are coherent, meaningful sets of learning objectives that focus on the use of information in the creation of products or rendering of services. Comprehensive courses integrate information and skills in varying proportions depending on the purpose of the course. Each course not only trains students to produce a product or provide a service within a given area of specialization but also provides the context for developing general educational skills and knowledge. Once programs are organized into comprehensive courses, they are benchmarked against a comprehensive classification system which grows as more programs are harmonized with it. Programs are then re-defined using courses from the system.

In addition to the articulation of existing programs, the classification system can be used to benchmark new curricula. When a new program is proposed, an advisory committee is formed consisting of practitioners in the occupation. In a brainstorming session, participants identify the requirements of the program. If cours-

The teacher's role as a broker of information is being replaced by one of an organizer and facilitator of learning. The focus of educational design shifts from teaching to learning and units of learning are seen as consumable services.

es already exist in the classification system, they are identified and adopted for the new program. When an area of specialization is identified that does not exist on the database, it is articulated and added to the system within the parameters of the established classification system.

The development of a comprehensive classification system for experiential learning has many implications for the reorganization of education and training in the information age. As more sophisticated computers are being designed to store and present information to suit the learning needs of students, learning is no longer restricted by the limitations of instruction. The teacher's role as a broker of information is being replaced by one of an organizer and facilitator of learning. The focus of educational design shifts from teaching to learning and units of learning are seen as consumable services. Marketability becomes a factor in this new paradigm as information and skills are organized by their obvious usefulness.

Organizing information from a learning perspective increases its accessibility. The use of a classifica-

tion system that is based on the needs of learners, rather than the needs of those who administer education programs, gives substance to the notion of equality outlined in the White Paper. It challenges the long-accepted educational value system associated with administrative structure. For example, when trades training is seen as an administrative entity, its value may be perceived as something less than learning accomplished under a different administrative jurisdiction. However, within the context of a comprehensive experiential learning system, each course takes on the value ascribed by the needs of the learner.

The harmonization of experiential learning programs produces systems of courses within areas of specialization which do not coincide with contemporary workplace occupations. Due to the proliferation of small business, employees and self-employed people require diverse combinations of skills and knowledge to effectively compete in the contemporary workplace. For example, workers may not only need to design, manufacture and maintain products. They may also need to market those prod-

ucts and provide continuing customer service. It is increasingly difficult to capture the different combinations of knowledge and skills required by many learners under a rigid comprehensive program. Consequently, narrowly focused programs are developed to serve specific needs and are subsequently discontinued. This is a costly way to maintain an education and training system. An experiential learning system provides the means for educators to offer greater flexibility within programs. It allows learners to have more input into the content of the preparatory and continuing education programs and it reduces considerably the number of administrative structures required to offer this education and training.

The use of a comprehensive classification system can make a significant contribution to the efficient use of educational funding. Course development and revision, transferability and prior learning can all be benchmarked to the system. Computerized databases can ensure the preservation of learning resources and create access to them even when the teaching workforce is transient. Since most prior learning is experiential, an experiential learning classification system is an indispensable tool in granting credit for prior learning and thus reducing unnecessary duplication in training. Transferability of documented credit would be automatic among educational institutions using the system. Through a classification system, inefficiencies give way to more efficient streamlining and set the stage for healthy competition among educational institutions on the basis of quality. This will translate into greater value for the training dollar.

Striving to meet the needs of learners in the information age will require educators to abandon the comfort of static administrative

(continued TRADES on page 31)

The Articulation Process

Brainstorming and/or existing program outlines and course materials are used to obtain tasks and information topics.

Tasks/topics are written on self-adhesive removable notes and placed on a large vertical surface such as a wall or projection screen.

Tasks/topics are arranged into areas of specialization; for example, welding, electrical, hydraulics, surveying, cooking, etc.

Areas of specialization are divided into service areas; for example, welding has five service areas - OFW, SMAW, GTAW, GMAW and FCAW.

Each service area is subdivided into consecutive competency level courses; for example, SMAW has four courses - SMAW Fundamentals, Position Fillet Welding, Position Butt Welding and Specialty Welding.

Course outlines are designed using a standard "comprehensive course" model. Programs are then redefined using the articulated courses.

Prior Learning Assessment

getting credit for what you know

In Prospects, volume one, number two, Fall 1994, a project on Prior Learning Assessment (PLA) was profiled. Cabot College of Applied Arts, Technology and Continuing Education has created a prior learning assessment policy that is designed to give mature students an opportunity to obtain course credit for knowledge and skills they have gained through experience. This process allows students to make the most of their previous experience, possibly decreases the length of time they need to spend in course work, helps bolster student self-esteem and makes more efficient use of human resource development facilities.

When students enter certain programs at Cabot College and feel they have developed skills and gained knowledge offered in a particular course, they may challenge that course for credit. A number of methods are used to evaluate students' learning gained from prior experiences. The written examination is the most common assessment method used. However, performance evaluation, interviews and oral examinations are also effective methods of evaluation. Portfolio development is gaining popularity as an evaluation method. A portfolio consists of a chronological record, life history paper, samples of work or products that provide proof of experience, and documentation verifying the comple-

tion of non-credit courses. The portfolio also contains essays supporting the students' belief that they are able to challenge particular courses for credit. The awarding of credit is determined by faculty within the various disciplines. This practice provides the program with a standard of quality control.

The institution also benefits from PLA. The faculty members gain insight into various assessment methods and have an opportunity to understand the nature of the adult learner. The process facilitates better use of college resources and helps foster partnerships between industry and education.

The Canada/Newfoundland COOPERATION Agreement on Human Resource Development funded a project for the prior learning assessment coordinator at Cabot College to develop and administer a "train the trainer" package for PLA. Sandra Evans has completed this project and an evaluation has been done by Warren and Roe Associates. The evaluation of the project was very positive. The evaluators recommended that a provincial policy be adopted by all public post-secondary institutions in the province, that a provincial coordinator be appointed and that a part-time coordinator be provided for each of the colleges who want to start a PLA program.

In August 1992, The

Newfoundland and Labrador Council on Higher Education was established to develop a mechanism for coordination and articulation among and across sectors of the province's education system. PLA is a priority for this council and in July 1995 the council published a consultation paper on the topic. In September 1995, the council began the implementation plan outlined in the consultation paper under funding provided by the COOPERATION Agreement on Human Resource Development.

PLA is also a priority for the Occupational and Career Information Branch (OCIB) of Human Resources Development Canada. A national steering committee has been established and Dr. Claude Clarke and Sandra Evans have been invited to sit on this committee. Dr. Edna Turpin Downey, president of Cabot College, is also active on a national board as a member of the PLA working group for the Canadian Labour Force Development Board. On October 23rd to 25th, 1995, the first national forum on PLA will take place in Ottawa. "This conference is a great opportunity to share ideas and promote PLA," says Sandra Evans. "The concept of prior learning assessment makes sense and is an important component of human resource development." Ω

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Apprenticeship Training and Compulsory Certification

a worker's point of view

by
Ford Hibbs

We live in a very competitive world. Out of necessity, we need to excel in what we do in order to meet the demands of a changing workplace. Unfortunately, it is difficult to develop a sense of pride in accomplishment as long as the present certification system is maintained. It too, must change to meet the demands of the workplace and the worker.

At present, anyone who wishes to be a carpenter can enter the workplace without any type of credentials. As a result, there are many people working in the carpentry trade who have not had sufficient training to meet the needs of the industry.

For some time, unions have advocated the certification of trades people that would allow only those certified to work in the industry. This would mean a radical change from the current situation. While certification of all trades people would not eliminate all problems in the industry, it would, nevertheless, be a vast

improvement of the system. The first step in this process is acceptance of the principle of certification by all interested groups, particularly government. In the meantime, the present system has to be made more accessible for those who wish to become trades people.

To accomplish this goal, a comprehensive review of training should be undertaken. This would result in more standardized training across the country and the elimination of different programs in different training institutions. A core program would include the basic skills needed to obtain an Interprovincial Certificate. The core program would be taught by supervisory personnel in a training facility. In the present system, an apprentice spends nine months in pre-employment and is then required to find 1200 hours of employment before returning to school. A revised core program should be completed in its entirety by the apprentice with the possible exception of short work



terms. The program should be approximately 3000 hours. In addition, specialty training would be offered. This training would include such areas as interior systems, scaffolding, blueprint reading, estimating and store entrances.

Compulsory certification will give the apprentice incentive to train and retrain. This program would address the needs of those individuals who wish to work in a better trained workplace than we presently have. Ω

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High School Co-operative Programs

“hire education”



by
Steve Brooks

For many high school students, the opportunity to explore career options through work site experience is very appealing. In recent years, co-operative education programs have provided this opportunity in many school districts throughout the province of Newfoundland and Labrador. With award-winning co-ops at Gonzaga High School and Brother Rice High School in St. John's, the future of this mode of learning has looked very bright indeed.

Co-operative education programs consist of school credit courses that combine classroom instruction in the school with approximately 200 hours of practical on-the-job training. This community-based learning program is a partnership involving high schools, businesses, post-secondary institutions, government agencies and service groups.

Co-operative education promotes a closer association of students and

working adults who are willing to share their knowledge and skills. Experienced employees help students make informed decisions about their future education and career choices as well as instill confidence to help them make a successful transition from school to the world of work or post-secondary education.

There are two types of co-operative education programs: career-exploratory and subject-based. Although future career awareness is an aspect of all co-ops, it is the primary objective of career-exploratory co-op programs. Student placements are based on their career interests and are intended to give them the opportunity to explore particular career paths. This is achieved through work experience, job shadowing and related research.

Subject-based co-op programs utilize the work site experience as an opportunity for students to expand on a curriculum area that they have been

Themes such as employer-employee relationships, team working, responsibility, and the importance of following instructions may be used by coordinators as focus points for student reflection on work site experience.

studying in school. Schools in Newfoundland and Labrador offer many different types of subject-based co-op programs, incorporating several courses of the curriculum such as Law, Science, Enterprise Education, Computer Education and Religious Studies. For example, students enroled in the high school course, Canadian Law, attend court sessions and discuss their observations with law enforcement officials.

The specific expectations of co-op education programs depend on the type of co-op and the career or curricular area of interest. It is possible, however, to identify four basic expectations of most co-operative education programs operating in Newfoundland and Labrador today. First, students should experience personal growth that will enable them to adapt better to the ever-changing circumstances in business, career paths and employment opportunities. Secondly, through workplace experience, students should attain a deeper understanding of a specific career or curricular area. Thirdly, students should develop skills and attitudes that will enable them to become fully

contributing members of society. Finally, students should become more aware of the changing role of technology in the operation, location and types of careers and businesses.

The challenge for the co-operative education coordinator in any school is to design a system of monitoring and record-keeping that ensures program expectations are met. Monitoring usually takes the form of work site visits and telephone conversations. The frequency of monitoring depends on how well students adapt to the work environment and on how well the employer accepts the program as a learning experience. If students show signs of dissatisfaction with their work assignments or appear unenthusiastic about following the employers' instructions, more frequent monitoring is needed. As well, if employers are reluctant to provide challenging opportunities or accept students as contributing members of the organization, the coordinators will provide more employer support. In most cases these situations are best avoided through properly delivered pre-employment sessions for the students and pre-employment briefings

with employers.

Good record-keeping depends largely on the establishment of effective training plans which are developed by the co-op coordinators in consultation with employers. These plans outline the career or curriculum components that students are expected to observe, perform with assistance, or perform alone.

Effective training plans are realistic in the scope and number of learning activities. Each learning activity is listed to eliminate confusion for students, employers and coordinators. Most training plans are designed as checklists to allow coordinators to identify readily when a particular activity has been accomplished. The plans are also designed to enable students to progress from simply observing to performing an activity unsupervised.

In addition to the monitoring process and the training plan, many co-op students are expected to complete daily work log reports and to keep a journal. The work log becomes a record of activities, whether on the training plan or not, that students have participated in during the work day. Journal writing provides an opportunity for students to reflect on the day's activities. Both the work log and journal are valuable during in-school reflective learning classes. Themes such as employer-employee relationships, team working, responsibility, and the importance of following instructions may be used by coordinators as focus points for student reflection on work site experience.

Another approach that schools and school boards have used to ensure that student and program expectations are met is through the creation of Co-op Advisory Committees. These committees, which are composed of school board representatives, parents, employers and students, usually meet four or five times a year.

The co-op coordinators report to the committees on a regular basis.

Evaluation of students' performance is particularly difficult in a program that enlists the cooperation of outside individuals and agencies to deliver educational programs. Unlike traditional methods of instruction where the classroom teacher sets all activities and evaluates students formally, co-op programs are customized to the workplace and students. Therefore, uniform evaluation is extremely difficult. Because coordinators must rely on feedback from employers and regular employees who are unlikely to be trained in student evaluation, the evaluation of co-op students requires a considerable amount of time for coordinators.

Elwood Regional High School in Deer Lake, which offers a subject-based co-op in Enterprise Education, conducted an exhaustive first year evaluation of the program. The evaluation included questionnaires to students, parents and employers.

Anonymity of all responses was ensured through the provision of self-addressed stamped envelopes for the return of questionnaires. Results of the evaluation show a high level of satisfaction with the program. All employers and parents and over 95% of students said they would recommend the program to others. In their responses, students declared that co-op education had assisted them in many ways. They believe that as a result of the experience they have become increasingly:

- at ease with adults
- aware of the concerns of business, industry and the community
- able to express opinions
- conscious of the needs of others
- willing to listen to the opinions of others
- positive about themselves
- positive about the workplace
- aware of life goals



Flight services specialist Michael Cooper helping to prepare flight records in the control tower at Deer Lake Airport

It appears that co-operative education has great potential in helping students become capable, confident and employable citizens.

Unfortunately, the federal government's budget in 1995 cut funding that assisted the establishment of co-operative education programs. While school boards can continue to establish co-op programs, it is now more difficult to do so because of financial restraints in this province.

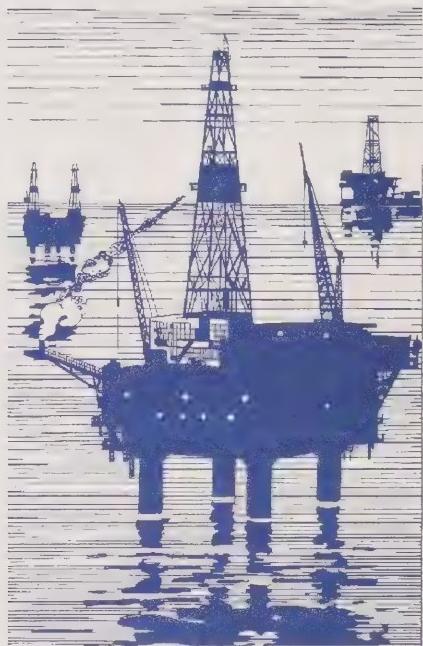
Schools and school boards that are interested in utilizing work site training in educational programs may take heart that the federal government, through Human Resources Development Canada, has implemented a funding program which assists the development of Youth Internship Programs. To date, funding for Youth Internship programs is similar to co-op education programs in that it provides for students to participate in work site training as part of their regular school experience. Such programs will require the same monitoring and record-keeping as co-op programs.

There is, however, an important difference between the intended primary learning outcome of youth internship and co-operative education programs. Where co-op programs are either career-exploratory or subject-based, youth internships, according to Human Resources Development Canada, are more vocational in nature. Youth Internship Programs introduce students to specific employment training in a growing sector of the economy. The training is more intensive than that outlined in co-operative education programs. In youth internship programs, specific work training must equal at least one third of the students' regular instructional time.

An additional benefit of both co-operative education and youth internship programs is the increased contact between schools and the community in the delivery of education. This contact increases the schools' awareness of community needs and expectations and provides avenues for community input regarding curriculum. *(continued HIGH SCHOOL on page 31)*

Memorial University Engineering

employing a co-operative
model to enhance
professional training



by
Merv Andrews
and
Paul Batstone

Research has demonstrated that the quality of education, particularly in professional schools, is greatly enhanced by programs which combine academic studies with industrial or workplace experience. Co-operative education is one program. Others include internships and apprenticeships. There are certain distinguishing features of each as well as certain advantages and disadvantages. All combine academic studies with industrial experience.

The co-op model in Memorial University's Faculty of Engineering is institution based. The students alternate between the educational institution and the workplace every three to four months for the duration of the program. The program is the responsibility of the institution even when the student is in the workplace. The student is often required to complete certain academic requirements while working for an employer.

In Canada, the University of Waterloo first introduced co-operative education into its Faculty of

Engineering in 1957. That university program was well received by industry and soon became highly recognized by the engineering profession.

HISTORY

Engineering at Memorial University of Newfoundland dates back to the early 1930's. The program was originally affiliated with the Nova Scotia Technical College (now the Technical University of Nova Scotia). Students completed the first three years at Memorial and the last two in Nova Scotia. In the late 1960's consultants from other Canadian universities evaluated the Newfoundland environment and the university, and recommended to the senate that a degree program be established and delivered in a co-operative format.

Following the decision of university senate, Dr. Angus Bruneau, P. Eng., a faculty member from the University of Waterloo, was hired as the first Dean of Engineering to develop a co-operative engineering degree program. The program was

designed to be of fourteen semesters in duration with six of these semesters spent in industry. Mr. Peter Young, P. Eng., a director of training with the Iron Ore Company of Canada was also hired. He was responsible for the work terms, including marketing and promotion. The first students were admitted in 1969 and graduated in 1974.

Today the Faculty of Engineering admits 180 students, the majority of whom have already completed 10 university courses. All students then take the same courses in the first two academic semesters of engineering studies. Upon entering Term 3, students choose one of four disciplines: civil, electrical, mechanical or naval architecture and ocean engineering. Upon successful completion of eight academic semesters and six work terms in the prescribed sequence, the Bachelor of Engineering degree is awarded. Memorial's program is also accredited by the Canadian Engineering Accreditation Board (CEAB) and the Canadian Association for Co-operative Education (CAFCE).

ELEMENTS OF CO-OP

CAFCE defines a co-operative education program as "a program that formally integrates a student's academic studies with work experience in co-operative employer organizations". The co-op programs have several requirements.

- Each work situation is developed and/or approved by the co-operative educational institution as a suitable learning experience.
- The co-operative education student is engaged in productive work rather than merely observing.
- The co-operative education student receives renumeration for the work performed.
- The co-operative education student's progress on the job is moni-

tored by the co-operative education institution.

- The total co-operative work experience is normally fifty percent of the time spent in academic study, and in no circumstances less than thirty percent.

A feature of co-op programs is that while the program is considered institution based, the institution does not "place" students with employers. The institution directs its efforts into encouraging employers to participate in the co-op program, and preparing students with job search skills. Jobs are advertised, and through an interview process, employers have complete freedom to select students. While the main objective for the industrial aspect of the program is to reinforce the principles learned in the academic portion, a secondary objective is to allow students to "earn while they learn". On work terms, students are paid a salary which is generally commensurate with their

level within the program. In many cases, the salaries enable the students to finance their education.

There are engineering students at work and on academic terms throughout the year. This feature reduces the demand on the teaching resources at the university while providing a consistent supply of technical help to industry during the fall, winter and summer semesters.

LEARNING OBJECTIVES

The general learning objectives of work terms are to develop:

- professional attitudes and behaviour
- interpersonal skills and maturity
- an ability to work as part of a team
- self-motivation
- an understanding of the 'broader' environment
- an ability to manage a work-related project
- a clearer understanding of career alternatives
- technical skills



Reeni Woolgar works with a coastal zone management program at the Centre for Marine Environment Initiatives during the final work term in her engineering program

...the exposure of the student to the industrial setting while pursuing academic studies tends to demonstrate the relevancy of scientific principles to the students.

Memorial University's calendar has a course description for each of the six work terms. It contains a brief outline of the faculty's expectations regarding work experience and technical writing (usually in the form of a technical report). The work term descriptions reflect the progression of the students from their first exposure to the engineering work environment to that of graduates about to embark on professional careers.

Once the student is hired, the employer has considerable freedom in assigning work. However, during the first week, each student is required to report specific work tasks that have been assigned and their professional expectations for the term. This information is reviewed and monitored throughout the term by the Faculty. This helps to ensure the overall learning objectives are being achieved and that each work term progresses in a positive manner for both student and employer.

MEMORIAL'S EXPERIENCE

At Memorial University several highly desirable characteristics have been identified as a result of this type of program. First, the exposure of the student to the industrial setting while pursuing academic studies tends to demonstrate the relevancy of scientific principles to the students.

Secondly, the experience of working in industry in an environment like the co-op program contributes greatly to students' abilities to compete in their chosen fields. Thirdly, the experience of dealing with deadlines and cooperating with other professionals often gives the co-op student an advantage over students who graduate from non co-op programs.

In most cases students progress to increasingly responsible jobs as they move through the program. Upon graduation many still find employment with previous employers through contacts made during their time in the program.

In the early years, students tended to seek jobs close to home. This may be explained by the under representation of professional engineers locally and the large number of resource-based industries that existed at that time. The availability of good work experiences elsewhere soon had students working in other provinces and overseas in the oil and gas sector.

Memorial University's engineering program has been well received by industry, business, and governments. Students now work in all provinces, Europe, the United States, and Asia. In a typical year, approximately 700 engineering students complete the work term requirements.

Because of its success, other

institutions have followed the University of Waterloo and Memorial into the co-op field. Many universities offer mandatory co-op programs for engineering, some offer optional co-op, and some traditional programs have optional professional years before graduation. In addition to universities, colleges have also recognized the value of co-op education for their technology programs.

While co-op education has been embraced by students and industry, the system is not without problems. It is a continuing challenge to maintain the quality of the work term experience. The expansion of co-op programs has led to increased pressure on the employer, community, and increased competition among institutions for available jobs. This combined with the economic cycles of recent years has reduced the number of co-op positions available to Memorial students.

In spite of these problems, the program continues to operate at almost a 100% level of employment, although there have been times in recent years when not all students could find work term positions or be suitably self-employed. When this occurs students are expected to work under contract to a client within the Faculty, elsewhere in the University, a company, municipality or non-profit organization. The contract work may be part-time, or occupy only a portion of the semester, and may allow the student to earn an income in other ways.

The university views the work term component as an integral part of the program and has a requirement for each student to successfully complete the work term before proceeding to the next academic term. However, when a student cannot meet the minimum requirement of the work (continued **ENGINEERING** on page 21)

Memorial University's Faculty of Business Administration

learning the ropes
in the real world



by
Albert Johnson

In the 1970s and early 1980s the Bachelor of Commerce degree program at Memorial University was often referred to as one of Canada's best kept secrets. In the 1990s the word is out and the program of studies offered by Memorial's Faculty of Business Administration enjoys a reputation for quality and cutting edge performance. The co-operative education component of the program has made a key contribution to this success.

Business students are required to complete prerequisite courses in their first year before they are accepted into the faculty. Once they have been admitted into the program they embark on four years of academic study and practical experience to obtain a Bachelor of Commerce degree. For the first five academic terms all students take a common program of introductory business,

computer studies, economics, statistics, and communications courses. In the final two academic terms, students may elect to concentrate studies in either accounting, finance, marketing, human resources and labour relations, small business/entrepreneurship or information systems. Another option is to complete a general program by selecting courses from two or more of these areas. Three work terms are interspersed within the seven terms spent studying in the faculty of business.

During these work terms students can be placed with businesses in Newfoundland and Labrador, other parts of Canada, or internationally. Employers are active participants from the onset and begin the selection process four months prior to each work term by providing job descriptions for the positions they wish to fill. First, the job descriptions are

made available to the students. The selection process is viewed by the students as a job competition and they respond to as many as twelve of the job descriptions by making application to the employers. The employers review the applications and interview the students. They rank the students they have found to be suitable for their jobs. The jobs are then offered to students by the university starting with the employers' highest rankings.

The university has well-established expectations for students and employers involved in the business co-operative program. To help students develop skills in time and project management, and in communications, they are required to complete a "Work Report" which is evaluated by the university. While the report is comprised of a project selected by the student and approved by the employer, the topic may also be assigned by the employer. In many cases, the report deals with the analysis of a practical, work-related business issue. The use of the employers' facilities and the allocation of time to the student for the report is at the employers' discretion.

Employers are expected to provide work assignments ranging from 14 to 17 weeks. They also participate in the student selection process, provide appropriate professional guidance and supervision, provide a salary consistent with the employer's organizational salary structure and allow an opportunity for a university representative to monitor the relationship between the

employer and student during the work term. At the end of the work term employers complete a written evaluation of the students' performance.

To establish an effective co-operative program the business sector and the university must establish a unique and open partnership. Over the years this relationship has been amicable but has not been immune to changes in the economy. "In the 70s and early 80s, the age of big business, large companies took many of our co-operative students," says Andrew Crichton, a coordinator in the busi-

ness co-operative education program. "In those days we could place several of our students with companies like Newfoundland Telephone and Ontario Hydro. At one point we had 23 students working in the accounting department of Mobil Oil in Calgary. By the late 80s, however, big business was cutting back. Because of these cutbacks and the rapid growth in small business we've had to change our focus for work placements. Small business has become one of our new major markets."

To help support this new small business initiative, the business school co-operative program has worked with the Economic Recovery

Commission to establish the Small Enterprise Co-operative Placement Assistance Program. It is hoped that this program will expose small businesses in Newfoundland and Labrador to the value of co-operative education, creating a long-term demand for co-operative education students. Proponents of the program also hope that students who participate will come to view the small business sector and entrepreneurial activity in general as viable career options.

The oil industry has also proven to be an available market for students participating in the co-operative program. As a result of the Canada/Newfoundland Offshore Agreement, the Atlantic Accord Career Development Awards Program was established. This program provides awards for students to gain work term experience directly or indirectly related to

the offshore oil and gas industry. As a result, many of these positions have been in overseas locations, typically in the United Kingdom, Norway, Germany and Netherlands. Between the Business and Engineering faculties, approximately 75 students per year are placed overseas and locally under this program.

Crichton is optimistic that initiatives like these will maintain the program through turbulent economic times. The work experience will give students an opportunity to develop professional attitudes and behaviour, and the abil-

T o establish an effective co-operative program the business sector and the university must establish a unique and open partnership. Over the years this relationship has been amicable but has not been immune to changes in the economy.



Kelly Colbourne and Joan McCarthy-Mason (standing) help business student Susan Drodge during her work term as a Self Employment Assistance Development Officer employed by the South Side Community Development Fund Corporation.

ity to be self-motivated team members. They will gain skills important in the business world, develop an understanding of professionalism and ethics, gain the ability to manage a work-related project, and find a clearer understanding of career alternatives. At the same time the "new economy" of small business is gaining important analysis as these students complete their work reports.

Several classes of business students have graduated from the co-operative program. Crichton believes as more students take their places in business, the co-operative program will grow. "Co-operative students create their own training culture," says Crichton. "Co-operative graduates have experience in the process. They know how best to utilize their students, while at the same time, giving the students the best possible work experience. The partnership is improving all the time." Ω

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(ENGINEERING continued from page 18)

terms, because of insufficient employment opportunities, the Faculty will consider exempting the student from that particular work term.

Memorial's engineering program has been well subscribed to by local and out-of-province students as well as foreign students. It is expected that as the university experiences an enrolment decrease in all faculties, the engineering program will likely experience a corresponding decrease.

Co-operative education programs are longer than traditional programs. Because of this, graduates show less interest in pursuing further studies than students graduating from traditional programs. This tends to fluctuate with the availability of full-time job opportunities in the marketplace.

CONCLUSION

Since 1974 when the first graduating class came through the program, more than 1900 students have obtained the Bachelor of Engineering degree via the co-op program at Memorial.

While a large number of these are practising within the province, others are located all over the world. The program continues to be highly regarded by industry and the graduates are fully accepted as highly skilled professionals. Ω

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Teacher Interns at Memorial University

prospective teachers work to perfect their craft in the province's schools

by
Trudi Johnson

For teacher interns, Kerri-Lynn O'Keefe, Lori Cluett, Lynette Stringer and Laurie Ryder, the beginning of the school year in September, 1995, marked the arrival of a long-awaited opportunity to teach in a primary and elementary school. After several years of academic courses at Memorial University, the field teaching experience offers them a chance to relate theory and practice in a meaningful way and demonstrate their own unique abilities in instruction and classroom management.

For centuries, student teachers learned the art of teaching by carefully observing the master teacher and gradually taking over the responsibility of classroom instruction. In recent years, this practice has been formalized into a structured internship program with the expectations and responsibilities of interns, co-operating teachers, supervisors and principals clearly defined.

In July 1991, completion of an internship program became a requirement for teacher certification in

Newfoundland and Labrador. Since then, the internship experience has become a vital part of the education program offered by Memorial University. Most teacher interns are placed in schools throughout the province but some students take advantage of the internship program offered at the campus in Harlow, England. Enrolment in the Harlow program has varied with each semester, with 24 attending in the spring of 1995.

Education students who are planning to teach primary and elementary school are required to complete a semester-length internship while students who are completing the high school program participate in a ten-week internship. The duration of this particular internship, currently under review, may be extended in future to give students in the high school program, for example, the opportunity to spend the entire semester in the school environment.

The Education program for secondary teachers at Memorial

University is a post-degree program with limited enrolment. Students are required to complete a Bachelor's degree before applying to the Faculty of Education and must achieve a specific academic standard to be accepted. Their first university degree must also include two concentrations of twelve courses and eight courses, respectively, in teachable subjects, that is, subjects currently offered in the province's school system.

The internship is the second field experience in each program. Students accepted to the primary or elementary level program benefit from observation days in a local school during the professional year of their program, including five observation days during the fall semester and five observation days during the winter semester. This experience is not designed to link students to a particular subject area; rather, to give them an opportunity to spend time in a school, understand its organization, establish a rapport with students and fellow teachers and develop a general sense of the teaching day. This brief exposure to the school environment is a valuable experience and enables the student to relate the realities of today's classroom to the information presented in their academic courses. Teacher intern Kerri-Lynn O'Keefe believes that education students would benefit from additional time in the classroom. "Observation days are very valuable. We learn a great deal from watching experienced teachers demonstrate their skills in classroom management. It's also a good time for interns to decide whether to stay with teaching as a career." From their observations, ideas are brought back to their university courses where they can exchange points of view and discuss their experiences with other teacher interns.

Students who are enroled in the secondary program participate in five



Lori Cluett, Laurie Ryder, Kerri-Lynn O'Keefe, and Lynette Stringer are teacher interns at Cowan Heights Elementary School in St. John's

observation days in the fall semester while they are completing a course in 'Effective Teaching' which covers different teaching methodologies and a course in 'The Contemporary Classroom' which includes a study of the sociology of schools, legal issues in education and an analysis of the relationships that exist in the school setting. These courses last for six weeks, the latter course being team-taught by various members of the Faculty of Education. The remaining eight weeks of the semester are spent on the methodology courses relevant to the interns' areas of study. All students complete a course on Evaluation.

Students in the secondary program complete a ten-week internship in one of the province's schools during the winter semester. Unlike work terms in other professional programs, the internship course is equivalent to university credits. The evaluation of the teacher intern is completed on a shared basis by the cooperating teacher and a representative of the Faculty of Education.

Recent trends in cooperation and

collaboration in education have had an impact on the organization of the internship program at the university. The faculty views itself in partnership with schools and has established contacts with school districts outside St. John's to give greater responsibility for the placement, orientation and supervision of interns in district schools. This does not mean that the university has relinquished its role in the internship. Instead, education faculty members are working to establish a stronger "university presence" in each school district when it comes to internship placement and evaluation. Faculty members believe that school district personnel are better able to place interns with appropriate, qualified co-operating teachers. They are also given the option to involve other school personnel besides the co-operating teacher in the evaluation of the student. At the same time, faculty members continue to liaise with school district personnel to standardize procedures of supervision and evaluation. This process allows students to be placed anywhere in the province. At present, students are

The teacher intern generally begins the internship process by observing the co-operating teacher and discussing teaching style and classroom management.

placed in schools in St. John's through the cooperation of principals of individual schools. However, this arrangement may change in future to align with the district policy elsewhere in the province.

The teacher intern generally begins the internship process by observing the co-operating teacher and discussing teaching style and classroom management. This interaction is a very important learning experience for both co-operating teacher and intern. Gradually, the intern takes on some teaching responsibility to the point where as the weeks progress at least 50% of the teaching duties belong to the intern. By the end of the teaching experience, the intern may actually spend a few days taking over all teaching duties to have a sense of a complete teaching day. Roy Chaytor, principal of Cowan Heights Elementary School, believes it is an excellent program. "While there are specific time allocations governing instruction, the amount of time an intern actually teaches often depends on the initiative of the intern. They also participate in extra-curricular activities and sit in on parent-teacher meetings."

Interns are required to keep a structured journal to record experiences, relevant incidents and responses to their teaching. This journal is

not formally evaluated but serves as a basis of communication with the supervisor and as a means to articulate thoughts and responses to the teaching experience. Dr. Frank Cramm, Coordinator of Undergraduate Programs, stresses that the whole internship experience is designed to combine "action and reflection" for the teacher interns. It is not enough to simply go through the motion of presenting a lesson. Teacher interns must reflect upon the experience if they are to develop their specific strengths.

Members of the Faculty of Education feel that increased consultation with school district personnel ensures that the internship program will be constantly reviewed and improved. Formal guidelines which define the roles and responsibilities of each participant result in greater standardization of the program. Both the co-operating teacher and the intern have a better understanding of what is expected and there is greater consistency with respect to expectations and evaluation across the province's school districts.

For the four interns at Cowan Heights Elementary School in St. John's, the first week was filled with anticipation and adjustment. While they were surprised by the large number of students in classrooms, they

were more amazed at the co-operating teachers' abilities to manage their classes effectively. They agree with Kerri-Lynn's view that, "Even with so many children, there is an uninhibited learning environment. Watching these teachers is fascinating. They have certainly perfected their craft."

Thanks to the internship program, Kerri-Lynn, Lori, Lynette, and Laurie and many others have the chance to do the same. Ω

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Medical Education

medical schools worldwide are reviewing the approaches they use to train new physicians



by
Barbara Blackie

The training of physicians has been a topic of much debate in recent years. There are different views on what physicians should be able to accomplish in the care of others, and how and where they are to practise. And, to further complicate the issue, health care funding is under fire. In this changing world of medicine, several things are certain. First, medical education is evolving, but faster in some schools than others. Secondly, patients, medical students, physicians and medical educators are having a say in the direction that evolution is proceeding. In response to calls from the public for more humanistic physicians, medical schools in Canada, and around the world, are re-examining their curricula.

In the past, as medicine became increasingly more technical and scientific, the trend was to select stu-

dents from undergraduate science programs such as biochemistry and molecular biology. These students fared well in the scientific components of medical school and medicine, but were ill-prepared to deal with the psychological, sociological, political and environmental issues which are being increasingly recognized as primary determinants of health and illness.

In addition, it is now recognized that students cannot be taught everything that they need to know in four short years of medical school in order to practise medicine. Instead, medical school is now seen as the beginning of a forty or even fifty year curriculum. Lifelong learning principles are certainly applicable to medicine.

Changes in society, the health care system and within medical schools are reflected in the following trends. There are increasingly more female medical students, greater

diversity in the applicants applying and larger pools of medical student applicants. There is more interest in health promotion, disease prevention, health education, and primary health care, with growing disappointment in the curative, hospital-based, tertiary medical care model. An interdisciplinary team approach including other health care providers (nurse practitioners, physiotherapists, occupational therapists, respiratory therapists, dieticians/nutritionists, chiropractors, midwives) is becoming more common. There has been a shift from the biomedical paradigm to the biopsychosocial paradigm.

This shift involves several important components. First of all, the introduction of problem-based curricula in North American and European schools has revolutionized medical schools. The premise is that learning all aspects of medicine can be based on investigating specific cases. For example, for a case of severe lower right quadrant abdominal pain, students would research the anatomy, neurology, physiology and biochemistry of the abdomen and organs most likely involved. They would research the possible and probable pathology and determine the tests that should be done to confirm a diagnosis. Depending on the school, the format may differ slightly. However, the idea is the same everywhere. Students learn in the context in which they will eventually see patients. People present their symptoms, doctors interpret the signs. The more traditional curriculum, primarily lecture-based, teaches disciplines separately. Problem-based teaching integrates these systems. The Faculty of Medicine at Memorial University combines a lecture-based curriculum with problem-solving components. This program, when implemented originally, was seen as very progressive. However, with the rapidly



Medical students in Maastricht, Netherlands, work on anatomically correct models like the arms pictured in the laboratory above before performing procedures on real patients.

changing curricula worldwide, there has been some pressure over the last four years to modify the program again, to include more of the problem-based learning approach.

Secondly, most schools now have a clinical component in the undergraduate program which allows for earlier interactions with patients. At one time, students experienced their first real clinical situations very late in the undergraduate programs, or early in the internship year. Several European schools still have no patient contact until after graduation. Some schools, such as Memorial University's Faculty of Medicine, begin teaching clinical skills in the first year.

By experiencing clinical situations early, Memorial University medical students are encouraged to interact with, listen to and appropriately interview a patient. Because actual medical knowledge is limited in the first year of studies, these interactions are often based on family histories, social situations, work and lifestyle issues. Medical students interact with patients as human beings, not as enti-

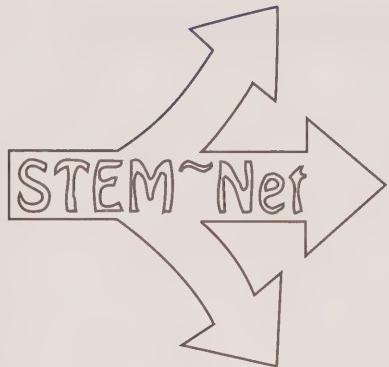
ties with diseases. The aim is to produce humanistic physicians.

At the First International Medical Students' Workshop on the Future of Medical Education, held in Maastricht, Netherlands, in November, 1994, the issues of problem-based learning and traditional lecture-based models came under much debate. The student-organized and student-run workshop hosted over sixty representatives from twenty-seven countries, and the curricular styles represented were diverse. Some felt that there would be insufficient basic sciences covered with problem-based learning, while others felt that this style promoted independent thinking and better problem-solving. The debate was not resolved, but ideas and perspectives flowed. Discussion allowed the delegates to return to their respective medical schools with more information and a great deal to consider.

With regard to clinical teaching, there was no debate. The students felt that the best patient care would be administered by those who had the greatest amount of clinical teaching (*continues MEDICINE on page 31*)

STEM~Net

strong acceptance
and
rapid growth



by
Harvey Weir

Hook Line and Net '95 sidebar
by
Nancy Parsons Heath

Teachers and other educational leaders in Newfoundland and Labrador have every reason to feel proud of STEM~Net. Their involvement and contributions have positioned STEM~Net as one of the world's fastest growing and most dynamic K-12 and rural college wide-area networks.

This is no accident. From the beginning, the STEM~Net boards, councils, committees and working groups have included teachers, program coordinators, curriculum consultants and educational administrators. Each board and college has assigned a STEM~Net coordinator and each school and campus has a volunteer STEM~Net lead teacher.

Most importantly, teachers are using STEM~Net to improve teaching and their own qualifications. In less than two years of operation, nearly 90% of the province's teachers

have applied for STEM~Net user permits, and more than 40% of these are used regularly. By December of 1995, every school and rural college campus in the province will have a computer and modem, cost-shared equally between the boards and STEM~Net. More than 80% of schools are already on-line. Most of these systems are located in staff rooms for convenient access by teachers. In a typical 24-hour period, there are approximately 4000 logins to STEM~Net, 9000 e-mail messages, 10 000 visits to its homepage on the world-wide-web, and 1000 file transfers from its FTP (file transfer protocol) site.

During the past two years STEM~Net has provided nearly 60 training workshops in all regions of the province for more than 600 coordinators and lead teachers, and nearly 40 more are planned for this year. STEM~Net, the NLTA Special

STEM~Net has been a leader in the development of the Canadian SchoolNet initiative and in national efforts to obtain affordable telecommunications rates for education.

Interest Councils and School Boards have run more than 100 other introductory workshops and demonstrations for nearly 2000 teachers, and others are planned for this year.

One of the reasons for STEM~Net's success is that its users are involved in the evolution of its interface and in the creation of its content. In response to user requests, STEM~Net moved from its rather unfriendly unix prompt to a somewhat user-friendly menu system, and this fall will be promoting a very user-friendly Windows graphics interface. From the beginning, STEM~Net users have been contributing content, initially to its Gopher and its FTP site and, more recently, to its World-Wide-Web.

Much of the recent excitement on the Internet is due to the World-Wide-Web, a graphics and hyper-text environment for document publishing, display and retrieval. Although Web texts can be displayed from STEM~Net's menu system, it is really in the colour graphics worlds of PC and Mac windows users, using browser software such as NetScape, that the Web really shines. In fact, where users have high-speed connections, the Web can support video and sound clips, making it potentially a multi-

media environment.

You start your exploration of the World-Wide-Web from STEM~Net's homepage. The first thing you notice is that this page is clean, neat and attractive. There are icons and "highlighted" hyper links for more than a dozen categories of documents or resources, including "Conferences/Workshops", "Curriculum Resources", "Schools", and "Community Resources". There is even a "Local Weather" icon that gives the weather report and displays a recent satellite image of Newfoundland and Labrador.

Using your computer mouse, you click on "highlighted" words or icons to link to documents on STEM~Net or elsewhere in the Internet world. For example, click on "Conferences/Workshops"; then click on "Hook, Line & Net 95", and, finally, click on "The Story in Pictures" to obtain a visual summary of the Corner Brook conference held in August, 1995. You can use the button bar at the top of your screen to move back and forth among your linked documents.

STEM~Net has held a number of workshops to encourage the development of Web documents by schools, school boards and the provincial gov-

ernment. More are planned for this fall and winter.

As early as May of 1993, months before STEM~Net was operational, primary and elementary teachers were calling for class involvement in curriculum-relevant networking projects. STEM~Net responded in the fall of 1994 by creating the Class Project Network, using a computer system donated by Digital Equipment Corporation. A set of pilot projects, involving nearly 100 teachers and approximately 1800 students, was undertaken during the past school year, and led to the deployment of the SchoolNet RINGS system and to the partnership with Cable Atlantic in the development of the STELLAR Schools Initiative.

The SchoolNet RINGS concept was developed by a six-member working group consisting of coordinators and teachers from two rural school boards and STEM~Net staff, and is supported by a grant from Industry Canada's SchoolNet initiative. RINGS stands for "Reports and Investigations by Networked Groups of Students". The name is also a metaphor describing how the system operates, by having students work in class-based teams or RINGS that are then linked via STEM~Net and the Internet to other classes to work cooperatively on common curriculum-oriented projects. This year's pilot RINGS projects will serve all provinces and territories of Canada as well as several countries throughout the world.

STELLAR Schools is an exciting initiative involving schools that are, or will be, served by Cable Atlantic's new high-speed interactive networking system. STELLAR is an acronym for "Striving Towards Excellence in Learning by Linking Activities and Resources". This initiative supports class-based projects with video, sound, graphics and text in a full

multi-media networking environment. Check it out under Projects on STEM~Net's homepage.

STEM~Net has been a leader in the development of the Canadian SchoolNet initiative and in national efforts to obtain affordable telecommunications rates for education. It has also worked to help launch the community access pilot project in this province with the Provincial Libraries Board, and in extending the NLnet backbone network to provide local STEM~Net access to about two-thirds of the province's educators and Internet access to about three-quarters of its population.

STEM~Net has also played a key role in the establishment of a "Chair" in telelearning within the Education Faculty of Memorial University, and in making Memorial University a part of the Network of Centres of Excellence in Telelearning.

STEM~Net has strongly supported the concept of an Open Learning and Information Network for the province and, in partnership with NLnet, will provide network support for this initiative. STEM~Net is also developing training events and workshops in partnership with the new Provincial Professional Development Centre. Many school boards and schools are anxious to link their local area networks to STEM~Net. A series of round-tables was held throughout the province in June to discuss programming, legal, technical, training and cost implications. A plan is being developed by STEM~Net in partnership with these boards. An extensive pilot project is being planned for this year.

STEM~Net's generous funding from the COOPERATION Agreement on Human Resource Development ends on March 31, 1996. At that time STEM~Net will have to raise most of its revenue from users. STEM~Net primarily supports

instruction, curriculum and professional development activities. Thus, it will have to turn to the provincial government, school boards and teachers to raise most of this funding.

Because STEM~Net is designed to benefit all teachers, it is anticipated that the NLTA membership, though its branch meetings and annual general meeting this year, will consider the question of payment by teachers. A small flat bi-weekly fee, perhaps to be collected from all NLTA members through regular payroll deduction, was one of the possibilities discussed with the NLTA President and senior staff when STEM~Net was first planned. It is still an attractive option, as it would reduce overhead costs to STEM~Net and send a strong signal of support to other potential funders such as school boards and the provincial government.

STEM~Net was built on the principle of regional equity, and would like to ensure that all regions of the province are charged the same rates for equivalent categories of service. However, paying for long-distance access is STEM~Net's most daunting challenge. Although rates have dropped significantly, they have not dropped as far or as quickly as needed to meet the increased usage of STEM~Net. With help from Canada's telephone companies and the CRTC, there is light at the end of the tunnel, but it may be one to two years before real relief is obtained.

Every effort must be made to move towards an affordable network model, as is the case with the STELLAR schools' initiative. We must create a networking environment in which everyone wins, including cable companies, telephone companies, schools, teachers and, most importantly, our students. STEM~Net is committed to this outcome. Ω

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Hook Line and Net '95



During the week of August 19-25, 1995, STEM~Net and SchoolNet jointly sponsored a seven-day Conference and Workshop in Corner Brook, Newfoundland. The event was called Hook, Line and Net '95. It included two days of pre-conference workshops, followed by a two-day conference, and three days of advanced workshops. Conference sessions were held at Presentation Junior High and workshops also were held at the Humber-St. Barbe Roman Catholic School Board Office and at the Fisher Building of Westviking College. In addition to the busy schedule of the conference itself, Kids Net Camps were organized for the children of conference participants. These were held at Regina High School and resulted in some wonderful web pages at the end of the two days.

The Hook, Line and Net conference provided the approximately 200 participants with an opportunity to explore the latest developments in educational networking, not only in

Newfoundland and Labrador, but also in other parts of Canada. Out-of-province guest speakers included Douglas Hull of SchoolNet, Lucio Teles from Simon Fraser University in British Columbia, Arnold McPherson from the New Brunswick Department of Education and Trevor Owen from Writers In Electronic Residence. Other presentations covered a range

of topics including the role of networking in distance education, Community Access, Public Computer Networks, the TILE Project of the Department of Education and Training, the STEM~Net Class Project Network, The Cable Atlantic/STEM~Net STELLAR Schools Project and many others. One of the highlights of the conference was the launch of SchoolNet RINGS, which is a national class project system that is being piloted and administered by STEM~Net during the 1995-96 school year.

For more information on many of the above topics, see the Hook, Line and Net '95 homepage (complete with pictures), by clicking on Conferences/Workshops on the STEM~Net homepage. More information on SchoolNet RINGS and STELLAR Schools can be found by clicking on Projects on the STEM~Net homepage.

Watch for Hook, Line and Net '96, tentatively scheduled for August, 1996, in St. John's. Ω



(TRADES continued from page 10)

structures in favour of more dynamic systems. The challenge will be to create comprehensive systems that work. Trades articulation establishes a basis for such a system, but its implementation needs to be carefully scrutinized.

The implications of articulating experiential learning programs are far-reaching and require considerable debate. However, a comprehensive classification system will enhance communication and facilitate discussion within education, business, industry, and the community. The work that has been done in the area of trades articulation in Newfoundland and Labrador is precedent setting, but greater possibilities lie in using the principles to articulate in other areas. As participants become more comfortable with articulated experiential learning, its growth will be inevitable. Ω

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(HIGH SCHOOL continued from page 15)

lum concerns. This program may also serve as a model for future educational partnerships which will broaden the educational experiences of students, teachers and community members.

The youth internship programs provide an opportunity for schools and school boards to continue in the development of educational programs incorporating work experience. As the results of the Elwood High School evaluation indicate, work experience programs are a valuable addition to the school curriculum, especially when they encourage greater co-operation between the school and community in setting and meeting the educational needs of students. Ω

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(MEDICINE continued from page 26)

throughout their undergraduate and residency years. Delegates strongly proposed that students should have more exposure to people. This could only improve learning and the way students interact with patients. The students felt that the key to achieving this is with supervised, professional teaching which allows for continuous feedback.

The health care system is undergoing massive restructuring. In the future the system may be radically different. However, the call for more humanistic physicians will undoubtedly continue. Medical school curriculum must rise to the challenge and provide the education and training needed. Early clinical experience and problem-based learning are just two of the areas in which medical students and faculty are proposing change. Ω

**Look for
Prospects
on the
World-Wide-Web
in October**

Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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COOPERATION



The COOPERATION Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the needs of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community and enterprise education, as well as provide programming for high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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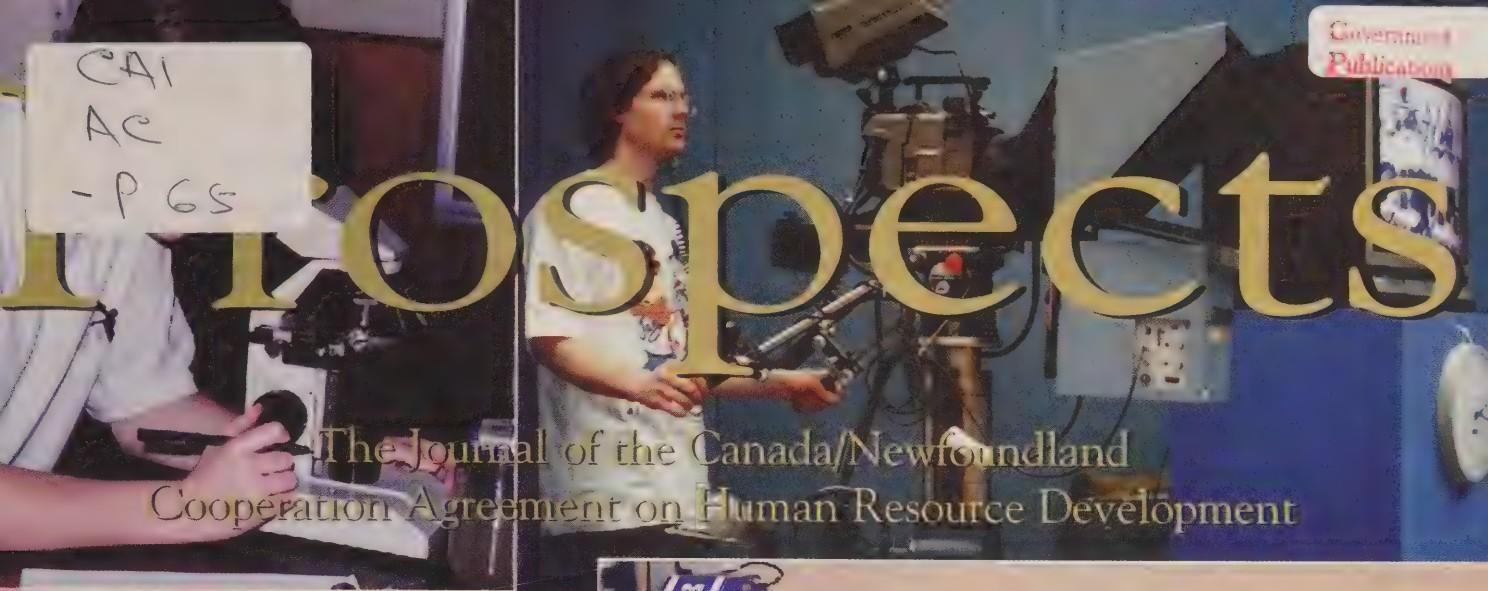
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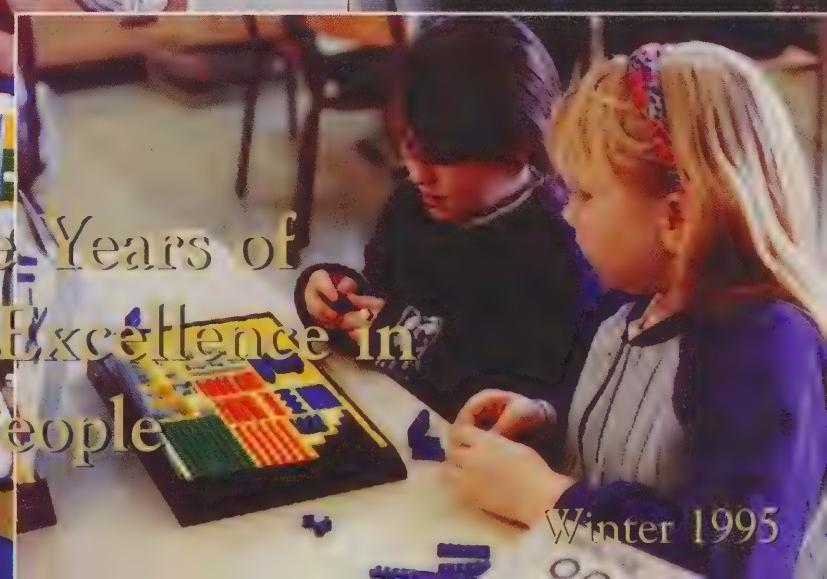


The Journal of the Canada/Newfoundland
Cooperation Agreement on Human Resource Development

COLLABORATION



Three Years of
Building Excellence in
People



Prospects

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Three Years of Building Excellence in People



January 21, 1996 marked the third anniversary of the signing of the Canada/ Newfoundland COOPERATION Agreement on Human Resource Development. During the three years the HRD Agreement has been in effect, the province has experienced economic change and has begun the long journey to economic renewal. The level of success we will attain depends largely on our ability to find new ways to work and new ways to learn.

Since 1993, the rate of growth of small business has been higher in this province than in any other province in Canada except for British Columbia. Business in our province has used a wider variety of our natural resources and has opened up markets for our products world wide. The high-tech industry has prospered and has been able to compete successfully in the global marketplace.

If our province is going to continue to make progress towards economic prosperity, we need to be innovative in education. For the past three years The Canada/Newfoundland COOPERATION Agreement on Human Resource Development has played an important role in encouraging innovation in education. The goal of the HRD Agreement is to build a

stronger economic base and improve the competitiveness of the Newfoundland and Labrador economy through human resource development.

During the first three years, the HRD Agreement has funded 429 projects throughout all regions of the province. Total contributions have been over \$27 million and have leveraged an estimated \$43.7 million from other sources. This funding has gone into projects that improve our entrepreneurial climate and learning culture; improve achievement and participation in science, technology and mathematics; and improve verbal and written communications skills. Still other programs help education and training institutions respond to the needs of small business and encourage working relationships among learning institutions, business and industry.

One of the first and most extensive projects undertaken by the HRD Agreement was STEM~Net. This computer network and Internet link for educators plays a major role in ending professional isolation for the province's educators. The network has become a conduit for sharing ideas and is a valuable source of information.

Many projects funded with schools are related to leading-edge computer technology. Educators throughout the province have developed innovative projects to improve student achievement. Students on the Burin Peninsula have been using email to communicate with noted Canadian authors in the "Writers In Electronic Residence" project (*Prospects*, V1N1). The staff members at G.C. Rowe Junior High in Corner Brook are teaching computer skills to their students in a networked computer facility (*Prospects*, V1N1). Teachers, students and parents at St. Pius Xth Elementary in St. John's are learning computer skills together in a project where parent volunteers learn to help students with the curriculum through the use of computers (*Prospects*, V1N2). The students at Cox's Cove Elementary use computer technology to produce a community newspaper and maintain electronic links with two other schools in the district (*this edition*). Enrichment students at Inglis Memorial High School in Bishop's Falls are using industry standard software and techniques to develop multimedia presentations that are being used as remedial material for the new intermediate level science program (*Prospects*, V2N1).

These and many other schools in Newfoundland and Labrador have established partnerships with the HRD Agreement to try new approaches that motivate and encourage their students to improve.

Many of the projects approved at the school board level focus on professional development. The HRD Agreement has funded conferences covering topics in various disciplines. Support was given to start the new Provincial Professional Development Centre for educators (*this edition*). In the Exploits Valley Integrated School District the HRD Agreement funded "Computer Aided Teacher Talk" (CATT). Teachers in the district are anxious to develop computer skills and implement the technology into their teaching. The board office staff devised a project where teachers learn to use the technology by establishing professional links with other teachers through email. Through this medium they discuss issues in education and technology, classroom management, lesson plans and teaching strategies (*Prospects*, V1N1).

Because our new economy puts greater demands on our education delivery systems, innovation in policy and the delivery of education is also a priority. The HRD Agreement has been active at this level and has been a partner in numerous initiatives.

Technology in Learning Environments (TILE), a research project funded by the HRD Agreement, investigated methods of implementing technology into the K to 12 curriculum (*Prospects*, V1N3). The need to measure the levels of success of programs and services in education was the impetus behind a project to create the Provincial Educational Indicators System. The indicators derived from this joint initiative of the HRD Agreement and the Department of Education and Training will monitor the achieve-

ment of students as new programs are implemented into the K to 12 system (*Prospects*, V1N3). One of the most promising and far-reaching projects supported by the HRD Agreement is the Open Learning and Information Network. This initiative offers impressive possibilities in the delivery of educational programs at all levels of training, for educational institutions, business and industry (*Prospects*, V2N2).

the success of any economy. The HRD Agreement is supporting a landmark project entitled, "Labour Relations: A Vision for the Future" that is bringing management and unions, employers and employees together to discuss reform to the labour relations legislation (*this edition*).

The most significant contribution of the HRD Agreement, however, is that it has fostered partnerships. It has nurtured a process that encourages educators, and people in industry and business to consider a broader view and understand the vital role education plays in economic success. The HRD Agreement has shown us that productive innovation in education has to involve everyone. In essence, we have rediscovered our sense of community. But this time, it's a much larger community.

Brian Langille, a respected authority in labour relations and labour law, supported this growing interest in the human factor in his keynote address to a labour relations conference held in St. John's on November 6, 1995. "In a world of free trade, mobile capital, liberal investment regimes, revolutions in technology and communications and transportation, people are the one enduring asset which nations possess. At the end of the day it is the talent of the population which is definitional of national economic success. In the long run, education of our children and intelligent labour market policies are all that we have."

For the past three years the Canada/Newfoundland COOPERATION Agreement has been building excellence in people. It's a real investment to foster economic prosperity.

Trudi Johnson
Albert Johnson
(editors)

Labour relations is an element in

DIRECTORY ASSISTANCE

What's "Elementary" on the Web

some points of interest
on the World-Wide-Web
for elementary teachers

by
Veronica Mahoney

These days, teachers need more resources at their disposal to make teaching and learning enjoyable, stimulating and exciting for their students and themselves. Trying to locate appropriate materials can be a challenge. However, the World-Wide-Web has quickly become the place to locate a wide range of curriculum support materials and professional resources.

If you are interested in enhancing and enriching your teaching, the Elementary Homepage is a must for you. This page can take you to a myriad of sites all over the world just by clicking on a variety of icons or highlighted words. To start, you must first access the STEM-Net Homepage (<http://www.stemnet.nf.ca>). On that page select Curriculum Resources, which will lead you to a variety of options. Clicking on Elementary will

bring you to our homepage. For each of the curriculum areas listed, links have been made to sites that will provide teachers and students with material to support and enrich the curriculum.

While at the Science/Math area, click on NASA Spacelink to visit the Spacelink Public Electronic Library and discover a variety of educational services and instructional materials. Find out the news from NASA - discover some NASA projects and find answers to some Spacelink Frequently Asked Questions. Visit the Hall of Dinosaurs by clicking on the Berkeley Dinosaur Exhibit. This leads to interesting and exciting information on Pterosaurs, Dinosaurs, Sauropoda, Tyrannosaurus Rex and many others. Street Cents On Line is about your money - how to get it and how to spend it. Young correspondents from

across Canada are always looking for what's a deal and what's not.

Clicking on the Language Arts icon can open a world of possibilities for teachers and students. Kids on the Web is an on-going list of sites that offer information for and about kids. Among other things, the sites include material for kids to play with, information for adults, and some information about K - 12 schools. The Bookwire "Best Bets" Index provides links to many book sites for children. Visit Shadowlands and watch a book being written day by day, or contact the author to take part in the writing. Access The Children's Literature Web Guide to discover Internet resources for Children's and Young Adults' Literature. Find lists of recommended books, lesson plans and information about a variety of children's authors.

The Social Studies teacher can dig around for information on archaeology at the Arch Net site or discover our country while visiting Canadiana. At the National Atlas Information Service examine the base maps, geographical names and thematic maps that reflect the social, economic, environmental and cultural fabric of Canada. Cartographic and geographical names services are also provided.

Explore the Possibilities provides teachers and students with the opportunity to visit an elementary school in another country. Hillside Elementary School in Minnesota has some interesting and exciting things happening. Drop by and meet the staff and students. Check out the students' writing. Explore strange and (Continued **ELEMENTARY** on page 26)

Developing Human Resources and the Internet



by
George Haché

In *Social Issues In Technology: A Format for Investigation* (1986), Paul Alcorn discusses change in relation to technologically intense environments where specialists' knowledge creates in us a desire for more knowledge. As this spiral intensifies, specialization ensues and awareness of new technological knowledge becomes increasingly important. Alcorn argues that surviving in changing technological environments requires vigilance and new ways of acquiring knowledge. Those who teach technology-based subjects would not dispute this view, nor the view that learning is at centre stage in this context.

Traditionally, trainers have been charged with the responsibility of preparing others to develop and maintain the tools of our technology. Trainers have acquired their expertise

and wisdom from years of experience. They typically select the knowledge, content, strategy, and tasks to be learned while providing a setting where trainees can develop insight, intuition, creativity, and skill. Weighing numerous factors and information when making their curricular and lesson decisions, trainers shape their instruction to interpret their trainees' work worlds.

Today, trainers have access to advanced communication tools and a growing abundance of knowledge that is contributing to new views of how to prepare training. They are rapidly approaching what Negroponte described in his book, *Being Digital*, as a "seamless digital world" where accessibility to training and work begin to merge. Training and learning and its relationship to work and the advancing information technology

compels a closer examination.

Enter the Internet (Net) - the World-Wide-Web (WWW), a network of networks that was born in the need to transfer messages. It has grown at breakneck speed, and is not likely to slow in the near future (*Mastering the Internet* by Cady & McGregor, 1995, 851-856). Describing this new technology as a "gold rush" of this century, "Calgary Herald" business columnist, Don Campbell, predicted increasing acceptance of the Net in "store front like" business and industry enterprise throughout Canada. The structures and tools available to search the Net provide trainers with a growing amount of information, and the means to locate and transfer this information.

A search for training-related information on the Net reveals semi-organized and interconnected collections of newsgroups, homepages, listings, and gophers. These identify individuals and groups who offer training services, along with commentary and reaction on how to offer training. The services vary and include catalogues of books and courses, collections of frequently asked questions (FAQ), and libraries to access tutors, discussion groups and lounges. They identify specialist consultants, locations for specific technical information, detailed strategies useful for research, techniques on how to submit material on the Net, and standards for judging the quality of Net-based training materials. As well, opportunities to register for specific courses, diploma and degree programs are readily accessible. These services are provided from agencies representing a host of technological fields and

professionals stationed throughout the world.

Criteria used to authorize certification reviews and judge the value of training and learning provisions are offered along with provisions to assist those individuals who are interested in developing and mounting information on the Net. These services are available upon request in both on-line and off-line delivery formats, some at no cost, others for a fee.

Training provisions available on the Net have grown largely unchecked. This is partially due to the rapid rate of change and increased participation of public, commercial, academic, special interest groups and individuals. The sheer abundance of content and structure that facilitates the delivery of information may arguably have a profound effect on how individuals learn. However, the extent to which the materials have undergone scrutiny is not readily apparent. The seasoned trainer might consider those Net services that are legitimate and beneficial to learning in an array of occupations that are controlled by certification and credentials.

Although there is questionable evidence to suggest that formalized means have been used to check the quality of training offered on the Net, individuals and groups who offer the information and services appear to hold that option. Indicators of training quality and restraint do not consistently reside in an overseeing authority and the user is left to search for that evidence. However, quality material does exist and is provided by reputable services. Material that is intuitively conceived and developed for specialized needs is also available. Evidence indicates that accountability varies with the provider of the information or service and that is likely to remain unchecked in the near future.

Regardless, there is little doubt that the abundance of information has greatly enhanced a belief that those who are familiar with the technology and have the skill to access it can derive meaningful learning experiences. This suggests a need for greater immediate reflection on what constitutes quality Net-based learning environments. For trainers it raises questions related to how the technology and the content can be utilized in

tion in the context of cognitive science and skill development. These include: matching Net-based content to thinking and problem-solving skills; exploring means of integrating technology into lesson development; providing readiness for working with individualized learning skills; and determining how to network individuals with tutorial provisions, examination, and skill development that require other tools.

In the *Scientific America* article entitled, "Digital Literacy: Multimedia", Richard Lanham argues that the learning capability of individuals depends on integrating word, imagery and sound while challenging the capacity to verbalize. The "best practices" related to individuals' ability to visualize, read and understand Net-based content, respond to Net information and services (remote learning), react to independent learning settings, and perceive the requirements of a Net-training environment are in need of exposure and examination. They remain critical in the learning environment for trainers and trainees. Ω

*T*hey are rapidly approaching what Negroponte described in his book, Being Digital, as a "seamless digital world" where accessibility to training and work begin to merge.

new training methods.

In this context, numerous considerations have arisen for trainers. One assumption that needs testing is the use of a telecommunications environment to transfer knowledge that adequately describes different occupational circumstances. How learners can benefit from instructional designs provided on the Net is a major ques-

Labour Relations: A Vision For The Future

an endeavour in labour relations reform brings business and labour together in a unique partnership

"We can put in place a set of rules that says: business, here's what you're required to do, or, employers, here's what you will be required to do; employees and unions, here's what you will be required to do. But what we can't do is legislate attitudes and atmosphere...That can only come by the joint action of those who employ and those who are employed." This quote is part of an address given by Premier Clyde Wells to more than 200 participants at the Labour Relations conference held in St. John's on November 6, 1995. The conference is one part of an initiative started by the Advisory Council on the Economy to facilitate labour relations reform and a new Labour Relations Act.

Business and labour agree that the current thirty-year-old act is obsolete. Many changes have occurred in the economy indicating that new legislation is required. First and foremost, our economy has experienced a fundamental shift from a goods-producing to a services-producing economy. We now have a more educated labour

force, more women in the workforce and more part-time workers. In manufacturing, low-technology, low-skill and low-wage jobs are being lost while high technology, high-skill, and high-wage manufacturing employment continues to expand. The small business sector has accounted for a greater percentage of all employment increases over the 1978–1992 period. Work hours are being reduced as workers take productivity gains in the form of leisure rather than income. Flexible working arrangements are being sought by employers as a way to increase productivity and use production capital more efficiently. Employees need increased flexibility to improve the balance between their work and private lives.

The provincial government recognizes the need to review and revise the present labour relations process. Possible solutions were presented in "Exploring Options", a discussion paper released by the government early in 1995. By the end of May 1995, the Department of Employment and Labour Relations had received twenty-four briefs in response to the

paper. Business and labour agree that broader and more profound changes than those outlined in the discussion paper are needed.

The Advisory Council on the Economy (ACE) proposed a process that would bring all stakeholders together to arrive at solutions through meaningful debate and discussion. First, ACE established an employer and labour working group made up of stakeholders from all sectors of the labour relations sphere. A small secretariat was created to do research and support the activities of the working group and the services of a consultant were retained.

The first task of the working group was to develop a set of operating principles and define objectives. The objective to this initiative is two fold:

- to create recommendations to improve the climate in labour management realtions
- to make recommendations concerning the current legislation in this area for the government of Newfoundland and Labraodor.

In order to reach these objectives, the working group and secretariat are carrying out detailed policy research and analysis. They make extensive use of experience from other provinces and countries. The working group has continued discussions with provincial stakeholders. These discussions culminated in a labour relations conference held in St. John's in November 1995.

The goal of the conference was to bring together a broad representation of labour and management to formulate recommendations for government that would contribute to a legislative framework for labour reform. Vince Withers, Chair of the Advisory Council on the Economy, opened the conference by describing how the initiative began, emphasizing what needed to be accomplished and the importance of the task. Tom Murphy, Minister of Employment and Labour Relations, welcomed the participants to the conference noting that this was the broadest group representing labour and management to get together in this way.

The address by Premier Clyde Wells highlighted other initiatives that have been established to encourage business growth in Newfoundland and Labrador. He then emphasized the impact that a positive labour relations climate could have on the provincial economy. "But there's one thing that, in my judgement, could well turn out to be better than all of those things put together, to have a greater impact on the rebuilding of our economy, on increasing economic activity, and in providing those 44,000 jobs that we're in need of, that can probably do a more effective job than anything else that we could do. And that's to be able to stand before the entire world and say we in this province have developed a disruption-free labour relations climate."

The keynote address was offered by Brian Langille, a professor of Labour and Contract Law at the University of Toronto. Langille has a great deal of experience in labour relations and labour law on the national and international stage. He provided the conference participants with a broad perspective on labour relations and the variables stakeholders had to consider as they discuss labour law reform. Langille also provided a clear image of how labour relations relates to general political theory and emphasized the importance of the process the participants were undertaking.

David Alcock, Chair of the Working Group—Labour Relations Initiative, then set the tasks for the discussion groups. The bulk of the conference day was left to the six discussion groups. Each group considered nine questions and made recommendations for reform through discussion that arose out of these questions:

- Does our labour relations climate help or hinder productivity and competitiveness?
- What changes are needed to promote a more harmonious labour relations climate, and what legislative changes are required?
- Should labour relations legislation be consolidated?
- What should be the role of government in labour relations?
- What should be the role and structure of the Labour Relations Board?
- Does labour legislation protect the rights of the employee/employer/union?
- Does third-party intervention and/or judicial review impede good labour relations?
- In what ways can we improve dispute settlement mechanisms?
- What other innovative/creative ways of improving labour relations do you suggest?

Summaries from each of the groups were presented at the end of the day. The conference concluded with a summary of ideas from the discussion groups that was offered by David Alcock.

The Working Group—Labour Relations Initiative is using the information gained from the research, discussions and the provincial conference to build a framework for a new Labour Relations Act. The group hopes to complete the task by the end of the first quarter of 1996. Ω

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COOPERATION Agreement on
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Building Economic Expertise

Memorial University develops a new graduate program in Applied Economics

Informed policy formation is fundamental to sound economic development. Professional economists make a significant contribution to the Newfoundland and Labrador economy. A graduate program currently being established at Memorial University will increase economic expertise and serve as a positive catalyst for effective economic policy formation. A Masters of Arts program in Applied Economics will begin in the fall of 1996. Utilizing the expertise of the faculty members of the Department of Economics, the graduate program will offer specialization in either natural resource economics or public sector economics.

The program, which is designed to be completed on a full-time basis over three semesters, includes six graduate courses and a thesis. The course work includes three core graduate courses in economics and three field courses selected from a specialization in natural resource economics, including environmental economics, or in public sector economics.

COURSES

Core

- Microeconomics
- Macroeconomics
- Econometrics

Natural Resource Economics

- Economics of Nonrenewable Natural Resources
- Economics of Renewable Natural Resources
- Environmental Economics
- Advanced Fisheries Economics
- Special Topics in Resource Economics

Public Sector Economics

- Taxation
- Public Expenditures
- Cost-benefit Analysis
- Fiscal Federalism
- Special Topics in Public Sector Economics

The program relates to current economic issues in Newfoundland and Labrador, with a particular focus

on resource economics, encompassing the resource sector of the local economy, such as mining, offshore oil, fisheries, water resources and forestry.

Dr. James Feehan, Associate Professor of Economics at Memorial University, is coordinating the program during the coming months. He is enthusiastic about the program's potential and looks forward to its beginning in the fall of 1996. "I think students will be attracted to the orientation of the program, which offers a good mix of theoretical and applied economics. The two areas of specialization will offer interesting options for research."

Approximately 60 students graduate from Memorial University's undergraduate economics program each year. To continue their studies in this field, they must leave the province. This program revives the graduate program in Economics at the university. Dr. Feehan hopes that some local students will be interested in studying applied economics because its orientation is particularly suited to this province.

"Newfoundland and Labrador students will be the core of the program. We may pick up other students from other parts of Canada and the United States but most outside interest has come from overseas students."

Yearly enrolment is expected to be between 10 and 15 students once the program is established. Because final approval was not received until late in this academic year, the department is expecting fewer students in the initial year.

The program has the potential to complement other initiatives currently being designed in provincial post-secondary institutions such as the Marine Institute and Memorial University's Faculty of Business Administration. In addition, it will enable those working in economic (Continued ECONOMICS on page 26)



Project Profile

Technology Capability

Cabot College provides training in manufacturing engineering technology for a growing economic sector

Recent growth in the manufacturing sector of the province's economy has led to the introduction of a new manufacturing technology program in advanced manufacturing techniques. Cabot College of Applied Arts, Technology and Continuing Education in St. John's is establishing a training program and manufacturing technology training centre which will build on the civil, electronic, architectural, electrical and mechanical capabilities of the college's School of Engineering Technology and Trades. This initiative is a response to the human resources requirement for the manufacturing industry. Cabot College will offer practical assistance to the manufacturing sector of Newfoundland and Labrador by providing the engineering staff and resources required to meet training as well as equipment

needs.

There are approximately 500 non-resource based manufacturing companies in the province. Many of these are small companies without sufficient staff and resources. Cabot College, through its training program and accompanying centre, will assist local manufacturers in a variety of activities designed to improve product quality, increase productivity, ensure workplace safety and minimize product development time.

The current three-year Mechanical Engineering Technology program will offer training in the fundamental skills required in this industry. Beginning in September 1996, students in their third year of studies in Mechanical or Industrial Engineering Technology will choose to complete their program in either heating ventilation and air condition-

ing, power engineering, or manufacturing technology. Industry training will be accommodated through the Division of Community and Corporate Services. Courses may be offered where possible through the established college system in the province. The initial offering of this program will be a conventional three-year course of study. However, the program may change to a co-op format depending on the demands of industry.

The manufacturing specific courses include Computer Aided Design/Computer Aided Manufacturing, Numerical Control, Manufacturing Processes, Robotics and Automated Systems, Tool Design and Quality Assurance. The program also incorporates courses pertaining to business operations in a manufacturing plant such as Manufacturing, Planning, Engineering Economics and Engineering Management. The business courses will promote student awareness of local opportunities and encourage an entrepreneurial outlook. Also included are courses normally associated with mechanical engineering technology programs such as Mechanics, Materials and Processes, Fluids and Strength of Materials.

Practical skills will be developed through shop courses such as Maintenance and Machine Shop. Additional courses have been recommended by the Newfoundland Manufacturers' Association. These include studies in motivation, teamwork, problem-solving, creativity and decision-making. Other areas of training will be offered as needed through seminars and workshops given by recognized experts in their fields.

The program is being developed using manufacturing elements of existing programs at other Canadian institutions. It also meets the standards required for national accreditation through the Canadian Council

of Technicians and Technologists. This will ensure that graduates of this program will be accepted throughout the rest of Canada as qualified technologists.

Developers of this program expect input from the manufacturing sector to be on-going to ensure the training needs of industry are current and at the appropriate technological level.

Maintaining the link between industry and the educational institution is vital to the success of this project. The primary goal of the program is to provide assistance to industry and training of students to service the manufacturing sector. The industrial linkage is secured through involvement of both faculty members and students in industrial projects and manufacturing issues. Representatives from the manufacturing industry are encouraged to have input into curriculum development through an advisory committee.

Providing support to the manufacturing industry, a strategic sector as identified by the Economic Recovery Commission, will promote economic development in the province. Graduates of manufacturing technology programs may expect employment opportunities in manufacturing and service industries, including design services, precision engineering, machining companies, product manufacture, and fabrication industries. They may operate as design draftspersons, equipment or instrument technicians, Computer Numerical Control (CNC) operators and programmers, and in other related technical and supervisory positions.

Daniel Wong, head of the School of Engineering Technology and Trades at Cabot College, is confident about the program's potential. "The manufacturing centre will be a major factor in promoting manufacturing in Newfoundland and Labrador," he says. The college believes that the

manufacturing sector offers considerable growth potential for the province. It is important, therefore, that this new program will be practical enough to meet the needs of local manufacturers while providing training that will ensure graduates are prepared for advances in manufacturing technology that will influence the industry in the near future. Ω

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Cabot College of Applied Arts,
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Project Profile

Central Newfoundland Regional College Counselling Centre



For most young people today, making academic and career choices is a formidable challenge. The pace of change and uncertainty of employment weigh heavily in the decision-making process. The Central Newfoundland Regional College is attempting to provide assistance to students by establishing a Guidance and Counselling Centre at that facility.

The proposed centre will be located at the Grand Falls-Windsor campus of the college. Students of the college, high school students and other clients from the area may take advantage of its counselling services. It will also serve as a guidance referral centre for other support agencies in the central Newfoundland region and complement the career guidance activities of high schools.

The activities of the Guidance and Counselling Centre will be developed in relation to the process through which potential clients progress. The underlying assumption is that students face different challenges at each stage of their education, from high school graduation to post-secondary graduation. The college has classified six stages of students' progress. The programs and services of the centre will be tailored to the needs of clients at their current

stage of education and training.

Clients in the initial pre-entry stage are high school students, high school graduates, and other potential post-secondary students including those returning to formal education after prolonged absence. For these students, the centre will provide educational background requirements for post-secondary programs and information regarding occupations. The objective of the centre is to increase clients' awareness and understanding of their interests, aptitudes, achievement, values and personal characteristics through the use of career counselling activities, individual and group counselling sessions, seminars and short courses. Clients will be encouraged to make decisions regarding careers based on their own interests and aptitudes. The centre will also assist clients to develop good decision-making skills.

The point-of-entry stage is directed towards those students who have been accepted into a post-secondary program. The centre's goal is to provide activities and services that will ensure students have the skills necessary to attain success in their chosen program. Seminars on study skills, time management, stress management and financial management will be provided. Information gained through

the pre-entry career assessment process will also be used to further assist students to achieve success in their programs.

Many students who are enrolled in post-secondary programs have difficulty adjusting to academic life. The centre will develop and implement interventions aimed at assisting clients in this adjustment. These will take into account many academic, social, environmental and personal factors which affect students' ability to succeed. Personnel at the centre are also cognizant of the fact that as students learn, they change their attitudes and values. The centre will offer a range of permanent programs, such as assertiveness training and job interview preparation, as well as provide other interventions in response to identified needs of clients.

For those students in the pre-graduation stage of their education, the primary goal of the centre is to assist in the development of knowledge, skills and abilities necessary to obtain successful entry into a changing economic environment. Services provided in this regard include labour market information seminars, skills development such as interview skills and resumé writing, school to work transition seminars and self-image projection.

Clients at the point of graduation will be assisted with job placement through several services provided by the centre. These include a Job Finding Club, computer network access, and electronic bulletin board.

For those in the final stage -graduates of a post-secondary institution- the centre will continue to meet their needs in job search, career transition and career advancement. Graduates will also be given an opportunity to participate in the activities of the centre.

Brian Tobin, guidance counsellor,
(continued GUIDANCE on page 15)

Getting The Message Out...

about the Newfoundland and Labrador economy

by
Geoff Meeker

It is difficult to work in the economic development field in Newfoundland and Labrador without becoming excited about prospects for the future.

That's the opinion of Cathy Duke, Executive Director of the Economic Recovery Commission (ERC) of Newfoundland and Labrador.

The ERC was established by Premier Clyde Wells in 1989 to advise the provincial government on the changes that are required for economic renewal. The commission is heavily involved in research and analysis to develop strategies and economic initiatives aimed at transforming the Newfoundland and Labrador economy. It is an action-oriented agency that initiates projects on its own.

The ERC's work is divided into four main areas of activity, one being a public education initiative which it calls "Getting the Message Out." As the name implies, Getting the Message Out is a wide-ranging communications strategy aimed at disseminating balanced, accurate and upbeat information about the Newfoundland and Labrador economy.

"There are many reasons for optimism about the economic development potential of this province," says Duke, who is responsible for the Getting the Message Out initiative.

"For starters," says Duke, "do you know that:

- the largest construction project in North America is happening right here in Newfoundland and Labrador?
- the fishery is worth more than \$400 million a year (thanks to an excellent year in the crab fishery)?
- we have companies in this province making a variety of products and exporting their professional services all over the world?
- the manufacturing sector is worth about \$1.8 billion (resource-based and non-resource based)?

- the establishment of 19 Regional Economic Development zones around the province will provide a new, stronger foundation for community economic development that gives people a real say in how their regions are developed?"

"There are some very serious challenges to economic development in this province," says Duke, "and they have been well documented and are well understood. But how many people can name even three positive points about the provincial economy? Too few, we think, despite the fact that there are many good things happening in the province."

That's the purpose of the Getting the Message Out initiative, she explains. "We're working to educate the public about the changes that are occurring in the Newfoundland and Labrador economy, to provide balanced information about the state of our economy and to highlight some of the success stories upon which we can build. Far too often, people hear only the negative. We believe that perception becomes reality and so our campaign focuses on good news stories."

Target groups for GMO include students and youth, educators, parents, community economic development groups, government, media, business people, unemployed and employed individuals. They try various ways to get the message out.

PRESENTATIONS

Because we are in danger of losing many of our young people to out-migration, it is especially important that the message be conveyed to youth. A dynamic multimedia presentation was developed for high school students. This presentation is given by Memorial University students as part of their work-term placement.

Because the presenters are close in age to the students, these presenta-



Jill Cavanagh and Susan Harrington, Memorial University's Faculty of Business Administration co-op students, speak to a class at Holy Heart of Mary High School.

tions have proven to be extremely popular. To date, more than 200 interactive presentations have been given to high schools across the province.

As well, senior staff at the ERC have made numerous presentations - more than 100 to date - to community economic development groups, business associations, college and university classes, provincial politicians and senior government officials.

INFORMATION KITS

Brochures, booklets and other information pieces have been prepared and distributed as part of a Getting the Message Out information kit. The kits are given to teachers during school visits and handed out to audience participants during GMO presentations. A key element in GMO kits is the Ambassador newsletter (see below).

AMBASSADOR NEWFOUNDLAND AND LABRADOR

A forerunner to the Getting the Message Out initiative, Ambassador Newfoundland and Labrador was launched in 1992 to help correct mis-

information and dispel outdated stereotypes about this province. There are now more than 500 opinion leaders, of whom half are expatriate Newfoundlanders and Labradorians, who work voluntarily during their travels to spread the good word about Newfoundland and Labrador. Some Ambassadors live in this province, others in other parts of Canada and several are based in the United States and other countries. During the last 18 months, out-of-province meetings have been held with Ambassadors and influential business leaders in Toronto, Vancouver, Ottawa and Boston.

THE AMBASSADOR NEWSLETTER

The flagship publication of the Ambassador Newfoundland and Labrador initiative is "The Ambassador Newsletter", a good news bulletin about people and companies in the province that was introduced in July 1993. The newsletter has been very well received and now has a circulation of 18,000. In addition to being circulated to the ERC's network of Ambassadors across the country, the newsletter has become one of the

key vehicles in our larger Getting the Message Out initiative and appears in GMO kits. It is circulated to all provincial and key national media, and to all teachers in the province through "The NLTA Bulletin". It is inserted in local business journals, appears on airline flights and in hotel guest rooms across the province and is available electronically through STEM~Net.

PARTNERSHIPS

Many public and private partnerships have been formed to assist in Getting the Message Out to new audiences, including the development of an electronic Homepage with the educational network STEM~Net - targeted primarily at educators and students. The address is <http://www.stemnet.nf.ca/Community/ERC/erc-page.html>. Agencies such as Enterprise Newfoundland and Labrador and the Women's Enterprise Bureau have assisted by delivering Getting the Message Out presentations to community groups. As well, the Department of Education and Training has provided assistance in the form of expertise and knowledge throughout the development of this program. The private sector has also helped with the development of the new multi-media presentation. Federal and provincial governments, through the COOPERATION Agreement on Human Resource Development, have also expressed their support of the Getting the Message Out initiative. In June of 1995 they funded a full-time position to develop a comprehensive communications strategy and to coordinate activities around this initiative. Other partnerships are evolving.

FUTURE DEVELOPMENTS

Many elements of the communications strategy have yet to be implemented. These initiatives will be

directed at groups other than students. These include the development of a multi-faceted campaign to raise the level of public awareness about the changing economy and our successes. The campaign hopes to improve the image that Newfoundlanders and Labradorians have of themselves and their capabilities. This may involve high profile advertising campaigns, and private sector partners will be invited to help get the message out.

"We're also drawing from willing participants in our Ambassador Newfoundland and Labrador initiative to expand our Ambassador Network," Duke added. "This smaller, more proactive group of highly motivated individuals will use their personal networks to identify and pursue new business opportunities."

The ERC will also organize and implement 'train the trainer' programs to broaden the base of individuals who can deliver presentations and communicate the message in other ways. Finally, a CD-ROM will be developed as well as a 15-minute Getting the Message Out infomercial to air on cable advertising and community channels.

All of the information contained in Getting the Message Out presentations, information kits, booklets and speaking notes is checked carefully for accuracy and is updated regularly, says Duke. "When we use statistics, we state clearly what they mean. When we talk about new growth sectors, we don't use abstract talk about future potential, we use concrete examples of businesses that are already leading the way in transforming the provincial economy."

"We also take pains to balance our information, to point out clearly that we do have some very real challenges to overcome. For the most part, however, the main focus of this initiative is to provide an exposure to

the many successful, positive things going on in the business and economic development community in this province." Ω

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Look for Prospects

on the
World-Wide-Web

at

<http://www.stemnet.nf.ca/community/prospects/>

Enterprise Education

using a case study approach

The P.J. Gardiner Institute and the Program Development Division of the Department of Education and Training recently combined their efforts to create resource materials for a course in Enterprise Education which is offered in the province's high schools. Sixteen case studies were developed, published, and distributed, with an accompanying instructor's manual, to all Newfoundland and Labrador high schools.

The effectiveness of the original sixteen cases was determined by a questionnaire sent to high schools in the province. After an analysis of the results of the questionnaires, as well as consultations with Enterprise Education teachers, the P.J. Gardiner Institute decided to design 'short snapper' cases which could be covered during one class period.

The program in Enterprise Education is a recent addition to the high school curriculum. While teachers agree that the use of case studies is a valuable instructional strategy, they also feel that course materials appropriate to local circumstances are required. For the course to be taught effectively, students need to identify with the information. This helps them to recognize that opportunities do exist in business.

Cases are based on actual businesses and organizations in realistic

settings where critical decisions must be made. Students are placed in a decision-making role, requiring them to identify alternatives and suggest possible solutions. Case studies focus on the unique problems of local businesses and so are relevant and recognizable to students throughout Newfoundland and Labrador.

A reviewing process ensures that each case is appropriate in content, language, length and level of difficulty. Twenty of these 'short snapper' cases are currently being developed. Ω

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(GUIDANCE continued from page 11) emphasizes the value of a guidance and counselling facility. "The centre will be community-based. Helping students find direction is beneficial for everyone, the students and the community."

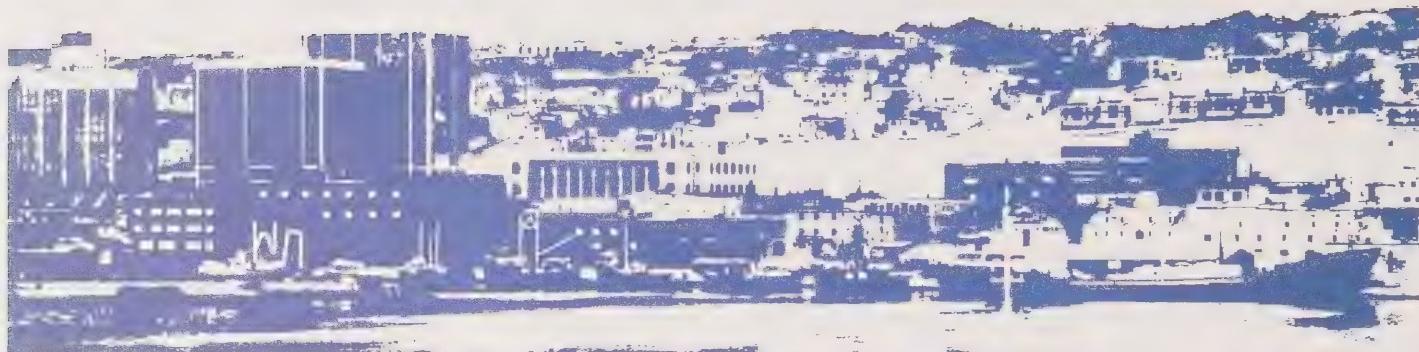
The Central Newfoundland Regional College works closely with other groups in the region in identifying and researching local training needs. By bringing together the college and the community to work on career-related issues, the Guidance and Counselling Centre will be helping students meet one of their greatest challenges. Ω

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Partnership Education

taking off the strait-jacket



by
Steven Brooks

Over the past few years a new movement has been slowly developing within the Newfoundland and Labrador education system. This movement, called partnership education, has been fuelled by the availability of federal funding through a variety of human resources development programs. Partnership education is in its infancy across Canada. It challenges the existing model of schooling and proposes an infinite number of possible learning opportunities. Simply, partnership education is the utilization of school-community partnerships for the purpose of providing learning experiences for students, teachers and community members.

Traditionally, throughout Canada, schools have tended to be autonomous enclaves operating with little or no community interaction. Communities have tended to view schools as the place their children go to learn from September to June. It was enough for community members to know their children had ready access to a school. Likewise, schools

tended to limit community involvement to the occasional guest speaker and parent-teacher interview nights. As long as the separation of school and community continued, the opportunity and need for greater school-community interaction went unnoticed.

However, as schools become involved in human resource development programs that require greater school-community interaction, schools and communities rediscover each other. Schools need to view their communities as a source of information regarding community expectations, expertise, employability skills, and history. Communities need to view their schools as resource centres in which learning and development are facilitated. The education of children is a community responsibility. The use of partnership education depends on the needs and resources of the community. Therefore, the range and scope of school-community partnerships will be as varied as the number of schools and communities involved in such partnerships.

One of the first programs that recognized the inherent benefit of partnership education is the cooperative education program. The co-op program requires that school personnel work together with businesses, government agencies and community organizations to develop out-of-school learning opportunities for students. The co-op program, or newly established youth internship program, are good examples of partnership education but are by no means the only approach to education. Partnership education can involve students participating in work site training, employees and employers in school-based upgrading of skills, or development of a regular educational tour of an industrial operation. In fact, school-community partnerships are only limited by our beliefs concerning the role of schools, teachers and students.

In addition to specific partnership benefits, general benefits of this type of cooperation can be enjoyed by students, schools and communities.

The student will:

- acquire a higher level of community awareness and concern
- attain a multi-dimensional educational experience
- gain a greater appreciation of the power of cooperation
- gain insights into local employment and business opportunities

The school will:

- become more aware of community expectations
- broaden its base of learning-resource people
- become a more approachable institution

The community will:

- gain influence in curriculum decision-making
- acquire access to school-based

The greatest obstacle to school-community partnerships is our existing school paradigm, and most of us are unaware of the influence it has on our decisions.

expertise

- acquire access to school facilities
- improve the sense of community within the student body

In order to reap the benefits, a school-community partnership should be established. Partnership education challenges many of our long held beliefs, specifically, about the role of the school, student and teacher, and generally about the nature and purpose of education.

The beliefs we carry with us regarding education make up our school image or paradigm. This paradigm determines what we consider possible and impossible in the educational context. In most instances we are unaware of the impact our school image has on our educational decisions. This is because most people share a similar set of beliefs about what constitutes schooling. For example, a group of grade eleven students decide to quit school because they have secured jobs. The employer hired the students because they already possess better computer skills than most adults. The parents feel that practical work experience is extremely important in today's competitive environment. In most instances, our school paradigm would compel us to declare, first, that the students need to make a choice between their short-term goals (per-

haps to purchase a car) and their long-term interest (continuation of their education), and, second, that the employer is exploiting the students. It would not occur to most of us that a partnership between the school, business and parents might enable the students to finish their education and retain their jobs.

Such a partnership might require a more flexible school timetable, with some courses offered in the evening or on the weekend, with some parent supervision and a possible integration of course curriculum objectives with student experiences at the workplace. The paradigm through which we view the role of the student, school and teacher would act as blinkers and prevent most of us from seeing the variety of options available in this particular instance.

The greatest obstacle to school-community partnerships is our existing school paradigm, and most of us are unaware of the influence it has on our decisions. In order to examine and challenge our school paradigm we must identify elements of that paradigm that we unconsciously accept as absolutes. Once identified these elements must be examined to determine the degree to which they are unchangeable absolutes. Some elements of a school paradigm that may be identified include:

- schools operate only from 8:30 to 3:30
- schools only operate from Monday to Friday
- schools must close July and August
- schools are inseparable from their buildings
- schools must be single institutions
- schools are places where students learn and teachers instruct
- schools are only for school-age children
- schools are only for the instruction of existing curriculum
- schools are primarily responsible for the preparation of students for post-secondary education
- there is no place in schools for graduated students

The degree to which these elements are absolute is open to debate. For example, 'schools operate only from 8:30 to 3:30' is obviously untrue when we consider extra-curricular activities. I doubt, however, that many administrators would consider developing a timetable in which teachers and students are given the opportunity to have some morning sessions off in return for participating in evening classes. However, once you consider the possibility, the advantages become obvious. Students with part-time jobs may better coordinate their in-school and out-of-school activities. Stress could be lifted from overcrowded cafeterias. Concerned parents could accompany students to class and assist with learning activities.

Schools must be single institutions. It is clear that schools are not alone in the education of our students. Other institutions that are stakeholders in education include public libraries, post-secondary schools, parent groups and businesses. However, with the exception of parent groups, these stakeholders operate outside the school. Is it possible to

envision a school containing the secondary school itself, the public library, post-secondary education and access for chamber of commerce meetings? If nothing else, such sharing of facilities would put great resources at the disposal of the student and would be far more cost-efficient.

Once we realize that our school paradigm is not an absolute, we are free to explore other models of schooling. Through the continuous examination of student, school, community and teacher needs and the evaluation of school and community assets, school-community partnerships will become self-evident.

There are three rules that guide partnership education. School-community partnerships do not have to be big and do not occur only in large centres. The most important aspect of developing school-community partnerships is how we think about the school's role in the community. The best example of an existing school-community partnership that illustrates these three rules is the yearly Royal Canadian Legion essay contest. The contest operates in large and small schools alike. The contest encourages students to examine Canada's role in world affairs. It serves the needs of the sponsor by promoting the beliefs of Legionnaires. Such a partnership could be replicated in any number of ways and in any community or school in the province.

Partnership education offers an exciting method for schools and school boards to broaden the educational experience of students and forge closer links between schools and communities. The impediment to establishing partnership education is our existing beliefs about school, students, communities and teachers. The benefits accruing from partnership education are certainly worth an exercise in introspection. Ω

"Towards Value Added Education": Partnership Education Institute

Elwood Regional High School in Deer Lake, Newfoundland, will be hosting a Partnership Education Institute on April 25th and 26th, 1996. The school has established a Department of Partnership Education to explore and promote partnership education programs. The Institute is open to educators, administrators, community leaders and business people.

Proposed sessions for this Institute include:

Partnerships - National Perspective
Developing a Partnership Mentality
Business Perspective
Partnerships through Co-operative Education
Partnerships through Youth Internship Programs
The Employability Skills Portfolio Program
The Visiting Arts Program
The Information Highway: Community Access Program
Exploring Partnership Funding Opportunities
Sustainable Communities
Regional Economic Development (RED) Zones
Partnership at the Classroom Level

For more information on this Partnership Education Institute contact:

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For the latest conference updates check the World-Wide-Web page at::

<http://www.stemnet.nf.ca/~bking/inews.html>

Junior Achievement



introducing business principles to Newfoundland and Labrador students

Many experts believe that diversification is an important factor in the economic recovery of Newfoundland and Labrador. Encouraging individuals to explore new business ideas is the key to economic diversification. Sustaining the economic momentum created by current business endeavours will fall to the province's young people. Preparing our students for their place in business is an important challenge that has been taken up by Junior Achievement.

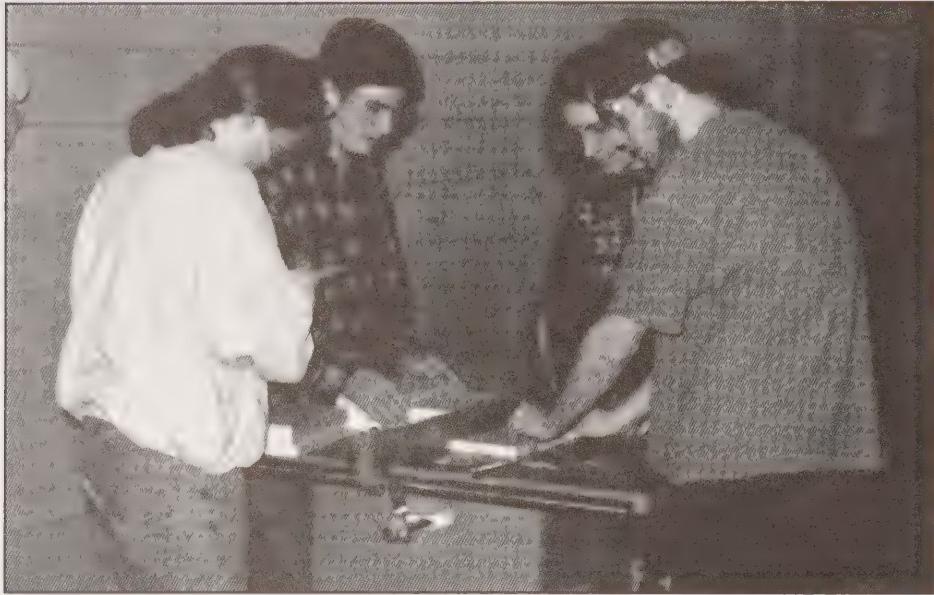
Junior Achievement (JA) is an international organization that started in the United States in the early 1900s. Since that time the organization has grown and is active in over 80 countries. JA first came to Newfoundland and Labrador in 1985 with eight company programs involving 100 high school students from the St. John's area. In ten years the program has grown to include three divisions, eastern, central and western, and involves over 5,000 students. The organization continues to expand in our province and this year, with support from the COOPERATION

Agreement on Human Resource Development, is establishing programs in Clarenville, Labrador West and the Straits of Labrador.

JA offers a number of programs for students from grades 5 to 12. The Company Program is an after-school activity designed to give students an opportunity to set up and run a business. This program targets students in grades 10 to 12 and runs from 21 to 26 weeks, from October to April. Groups of approximately 12 to 20 students form a company, select and produce a product or service, and operate the company with the assistance of business advisors. The groups meet once a week in the evening for approximately two and one half hours. The students must establish objectives for the company, raise capital by selling company shares in the community, organize a board of directors and elect officers, manufacture and market a product or service, maintain a computerized financial record system, and pay wages, salaries, commissions and taxes. At the end of the project the group must close the books, handle dividend declaration or

payment, liquidate all assets, settle accounts and prepare an annual report. Any profit made by the company is donated back to the community.

In Pasadena, Newfoundland, JA has been able to maintain a strong company program for a number of years. Each Wednesday night 24 students from Pasadena Academy and seven advisors meet to work at their business. This year the company has decided to produce a copy stand. Late in November the group was in the midst of manufacturing their product. Judy Perry, a level III student and a three-year veteran of the Junior Achievement company program, is president of the board of directors. "I've enjoyed the program," says Perry. "I've gained valuable business experience, had to learn to solve problems in a real business situation and have learned the value of team work." Lesley Noseworthy, who is a level II student with two years experience in the program, is the vice-president in charge of administration. She feels the program is a valuable experience. "It's a great social experience. We get



Students in the JA Company Program in Pasadena do their part in the production of the company product

a chance to practise our public-speaking skills and learn how to organize our work."

The volunteer advisors with the program in Pasadena enjoy working with the students. Donna Humber, an advisor who helps the group with some of the computer software, gets a great deal of satisfaction from working with the program. "Teenagers are underestimated," she says. "They have great ideas and are a real joy to work with. We form some wonderful relationships here and get a chance to help them work through some real life problems."

JA also offers programs for other grade levels. The Business Basics Program targets students in grades five and six. The program is offered by a volunteer business person from the community. Students are taught in business basics in four one-hour sessions. The volunteer guides the students through an introduction to basic elements of organization, management, production and marketing. Classroom teachers will often incorporate these four sessions into a resource-based learning unit that deals with business and financial life

skills.

There are two programs targeted to students in grades 8 to 10, the Economics of Staying in School and Project Business. The Economics of Staying in School is a series of four classroom activities designed to help students understand the importance of an education and the personal and economic costs of dropping out. A volunteer consultant from the business community meets with the students in four to six classroom sessions. Initially, a survey is completed on the hopes and aspirations of students and is used as a base to compare subsequent attitudes after the sessions are completed. Students then consider the meaning of success and use a board game to illustrate the relationship between education and the attainment of personal goals. Students consider the costs of living on their own and compare lifestyle expectations and the salaries necessary to attain them. Students also complete a personal interest and skills inventory to identify the types of careers which match their interest, and they match the skills and knowledge developed from their courses in school against

the needs of employers.

Project Business is a program designed to introduce economic concepts and help students become more aware of the role business plays in their community. A volunteer meets with the class as a supplement to an existing course in social studies or economics. Topics covered in the eight classroom sessions include the Canadian economic system, the marketing system, money and banking, financial statements, the role of consumers, and career possibilities in the business sector.

Dianne Bishop is the executive director of Junior Achievement of Newfoundland and Labrador and is working to bring the programs to new areas in the province. "I can't emphasize enough the importance of volunteers," says Bishop. "JA provides training to them before they deliver the programs, but it is their experience and willingness to share their expertise with our young people that makes JA work." In the 1994-95 school year JA sponsored over 200 of these classroom programs throughout Newfoundland and Labrador. Ω

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Junior Achievement of
Newfoundland and Labrador Inc.

COOPERATION Agreement on
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Aquaculture For High School Students



Cottrell's Cove Academy takes a practical approach to the curriculum needs of their students

When the moratorium on northern cod was announced in 1992, many coastal communities in Newfoundland and Labrador were economically devastated. The communities of Cottrell's Cove, Morres Cove and Fortune Harbour were no exception. However, communities in this area have an advantage that is proving to be a significant factor in the area's future. Atlantic Ocean Farms Ltd. of Fortune Harbour has been operating one the largest mussel farms on the continent for the past fourteen years. As Jim Ward, operations manager at the aquaculture site in Fortune Harbour, works to expand his operation around the province he is concerned about finding qualified people to work in the industry. To encourage students to consider aquaculture as a viable career option, Cottrell's Cove Academy, Atlantic Ocean Farms Ltd., Exploits Valley Integrated School Board, the Marine Institute and the COOPERATION Agreement on Human Resource Development have formed a partnership to develop and offer a course in aquaculture to high school students in the area.

Aquaculture is a growing industry in Newfoundland and Darren Woolridge, a teacher at Cottrell's Cove Academy, is eager to show his students the potential of this opportunity. Cottrell's Cove Academy is an all grade school with a population of sixty-seven students and eight teachers. "This is a great chance to introduce students to the potential of this new industry," says Woolridge. "Studying the industry in partnership with a working farm gives students an opportunity to see how science, computer technology, economics and various aspects of law are important to the daily operation of a real business. It makes it very easy for my students to understand the relevance of the work they're doing in school." Ten students from levels I and II are registered in the aquaculture course this year.

Establishing a commercial aquaculture enterprise involves four steps. The curriculum has been broken down from these four stages into five units. As the students progress through these units they learn how to establish an aquaculture farm. Step one is a planning stage. Developers must consider the economic feasibility, biological feasibility and legal constraints as they start their aquaculture site. Students consider a variety of subject areas as they work through the planning stage.

As students weigh the economic feasibility of their site they consider supply and demand, threshold population, competition from other food products, and other factors that influence the price of their product. They evaluate sources of potential startup revenue as compared to the costs of production. Students study the economics of running a small business as they consider system costs such as the initial investment for land, buildings and equipment. They also calculate the cost of maintenance and depreciation on equipment and buildings, deal with taxes, and calculate the interest on working capital. As the students move further into the course they consider production costs. Fish stock, chemicals, feed, labour, water pumping, heating, oxygenating and fuel are calculated into the costs. Finally, processing and marketing costs are added to complete the tally of expenses.

Learning to determine the biological feasibility of an aquaculture site is



Aquaculture students practise the rope-work they will need to master before they move to the aquaculture site

an ongoing process throughout the course. The water supply is a critical environmental constraint in choosing an aquaculture site. Students learn to evaluate water supply for desirable characteristics such as a relatively consistent flow, constant water temperatures, high levels of dissolved oxygen, low levels of harmful gases and pollutants, low siltation levels and limited risk of the introduction of diseases or wild fish. Based on these characteristics, students learn to rank potential sites and match these sites to the aquatic organisms best suited to the environment.

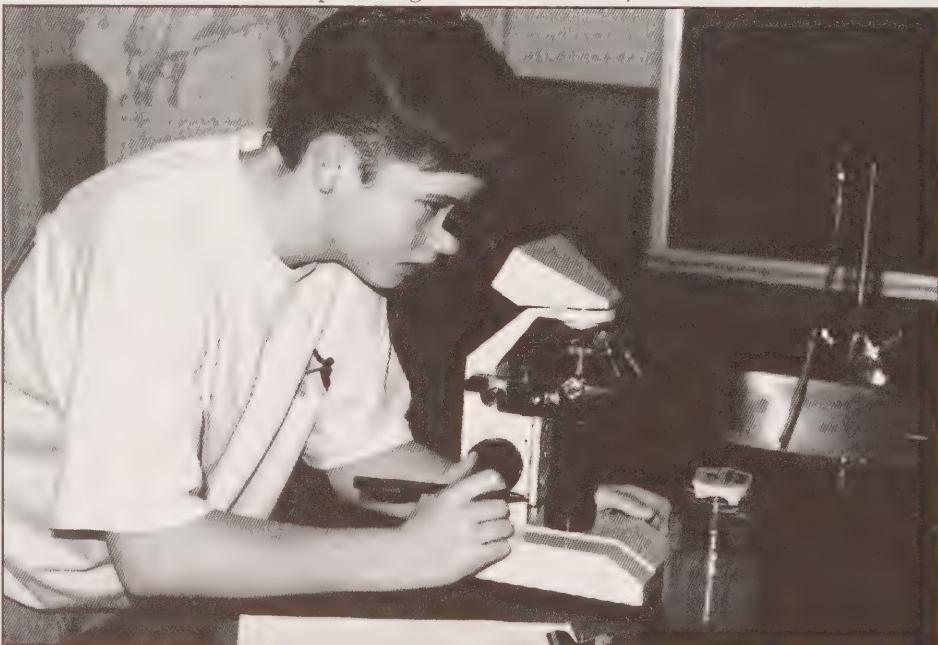
Students also need to understand the animals that are farmed. Species farmed in natural water supplies are influenced by other aquatic animals. Students need to study the influence these animals will have on the commercial crop and understand how the presence of a large concentration of the cultured animals will affect the ecosystem. Gaining control over the reproductive biology of the cultured organism is also essential for commercial production.

When aquatic animals are raised in an aquaculture environment, they are crowded into a limited area. This tends to promote the spread of disease. Therefore, students also need to understand disease resistance and control for various species.

Another factor in the planning

stage is the consideration of legalities. Various local, provincial and federal laws influence the development of an aquaculture site. Regulations concerning land-use, water-use, the environment, and health and safety all play a role. Students research the laws and legislation that govern the industry and study how they apply to the model they are considering.

The second step in establishing an aquaculture site is the training stage. To study this part of the process, students do a case study of Atlantic Ocean Farms based on the information they studied in the planning stage. They complete a site evaluation by monitoring critical water supply characteristics. Students also study the biology of mussels. They collect spat (mussels in a very early stage of development) and use a microscope to identify, measure and count the spat to determine the best time to place collectors in the water. The students learn to use computer technology to store and analyze the data they collect regarding the site and the mussels. This data will be saved each year as the course is com-



Madonna Budgell examines a water sample taken from the aquaculture farm to determine the concentration of spat

pleted and as it accumulates will become a significant database of biological and environmental information for aquaculture development in the area.

Aquaculture is very labour intensive and students are taught how to work on the site at Atlantic Ocean Farms. Task analysis is an important part of the process. Students evaluate the work required and learn the most efficient methods of completing the various tasks. Students are trained in boat safety, and shellfish health and sanitation. They are also trained in the proper use of ropes, a major component in the farming of mussels.

Step three, the pilot test, is conducted at Atlantic Ocean Farms. The pilot permits a commercial trial to determine the validity of estimates made during the planning stage. Students set out a test line using different types of collectors and place the collectors in socks (equipment used to protect the mussels as they live on the rope-like collectors). The pilot line is monitored by classes over a three-year period, the time required for mussels to grow to commercial maturity. Students in future classes will monitor the pilot lines and evaluate the growth of the mussels in respect to the different types of collectors used.

The final step in establishing an aquaculture site is the move to commercial operation. The school's partnership with Atlantic Ocean Farms gives students an opportunity to study this step in the process. Although classes in the first two years will be unable to harvest mussels from the pilot lines, they will be able to observe the harvest in other areas of the farm and follow these mature mussels through processing.

Woolridge is excited about the potential of the course. "It's a great experience for our students," he says. "They are faced with the challenge of



At Atlantic Ocean Farms the students will learn the function of this barge and other company equipment

establishing an aquaculture site and have to go through a rigorous process of research and problem-solving to come up with solutions to real problems. What they learn here is not limited to aquaculture. As they work through the experience they will learn that before they enter into any enterprise they will need to plan carefully, gather all the information that is available to them and apply that information to their unique situation."

The students are enjoying these new challenges and some of them are eager to prepare themselves for careers in aquaculture. "I'd like to come back and work in my own community," say Brenda Budgell, a student in the first aquaculture class. "I like it here and I'd like to see our community prosper."

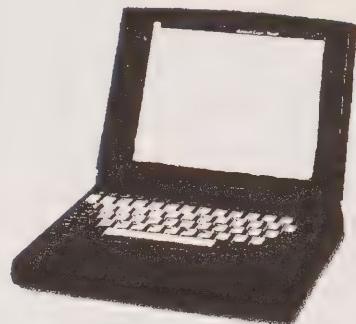
Woolridge is hopeful that this exposure to aquaculture will encourage students to take advantage of some of the new programs in marine science offered at the Marine Institute and Memorial University. "Aquaculture has great potential in our province. All we need to do is

help some of our young people take advantage of it." Ω

Project Partners:
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Taking Technology To Teachers



a mobile computer lab plays
a major role in teacher
inservicing in Green Bay

The Green Bay school district is widely-dispersed, serving 2250 students and 190 educators in 18 schools. The district spans 400 kilometres of road and two schools are accessible by water only.

Integrating computer technology into the curriculum depends greatly on the ability of teachers to deal with the new technology. Staff at the Green Bay Integrated School Board office have taken up the challenge of inservicing their teachers by utilizing a mobile training unit.

The district has established a strong commitment to teacher inservice in computer technology and resource-based learning. All teachers in the district have already completed two full day inservices, Day 1 was an introduction to DOS and Day 2 dealt with word processing. "We brought our teachers to the board office in small groups to complete the inservice days," says Lloyd Greenham, assistant superintendent of programs. "Many teachers are using computers

in their work but we want to help them implement this technology into their lesson plans." The members of the school board's technology committee will use the new mobile unit to complete a comprehensive inservice to help teachers use more technology in their teaching. The training facility consists of eight colour laptop computers networked to a Pentium 90 file server.

The plan calls for two more full inservice days for every teacher in the district. The inservice guide provided to each teacher already contains information from the first two days. During the first day of this current initiative, Day 3 of the inservice agenda, teachers consider cooperative learning and software evaluation. In the session on cooperative learning, teachers discuss the merits of cooperative, competitive and individualistic learning. In the session on software, teachers use the mobile unit to work through a software evaluation.

As the teachers evaluate the soft-

ware packages, they consider a number of criteria. They begin by recording the publisher and date of publication, the subject area and target grade level, and record the general description of the program provided by the publisher. They then determine the application: one of drill and practice, enrichment, diagnostic, instruction, a game, a simulation, remediation, creativity, problem-solving or research. They also determine whether it would be used by individual students, cooperative groups or for whole class instruction. Then teachers rate the program on a scale of one to five using the following criteria:

- clarity of directions
- simplicity of use
- appropriateness for intended audience
- effectiveness of feedback (interactive program)
- use of graphics, sound and colour
- amount of student interaction with program

- degree of motivation (student)
- ability to be used independently by students
- degree of relevance to the curriculum
- appropriateness of character size and fonts
- allowance for individual differences (difficulty levels)
- amount of learner control (choice, manipulation)

Teachers are asked to comment on the extent to which they feel the program can be integrated into the curriculum.

The next section of the evaluation deals with curriculum and content appropriateness. In this section teachers deal with questions such as:

- Can the material presented in this program be just as effectively or more effectively taught using other methodologies?
- Are follow-up activities provided within the program? (quizzes or research)
- Is the content accurate and up-to-date, free from racial and gender bias?
- Can the teacher or student modify the content?
- Does the program do what it claims to do?

The final question teachers have to consider is whether they would recommend purchase of the program.

During the workshop a number of software packages are evaluated. When the evaluations are completed, teachers use the merge functions of WordPerfect to tabulate and summarize their findings. The information is then presented to the rest of the group on a single page. The program is identified by title, grade and subject area, and its general description. A two column format is used to present the strengths and weaknesses of the software.

Ellis Stuckless, the school improvement coordinator for the district, believes that software evaluation is an important key in implementing computer technology into

the classroom. "Software is what will drive the use of technology in the classroom," says Stuckless. "It's important that we help our teachers identify the effective packages. Sharing our findings will add to the pool of information to help us all use our computer resources more effectively."

Day Four of the inservice will deal with designing a lesson or unit which uses various aspects of technology.

Paul Rose and Clyde Cole, resource-based learning itiner-

ant teachers with the board, will present a unit in Biology 3201 on human reproduction. "We chose this topic because we felt it would be a unit some teachers and students would find delicate," says Rose. "If we can show them that this topic can be taught as a resource-based unit we felt that presenting other topics using similar methods would appear relatively easy. The topic was also chosen because it is in a public exam course, where teachers often feel there is not enough time to deal with topics using the resource-based learning approach." Rose and Cole will demonstrate how they devised the unit using resources such as a CD-ROM station, a laserdisc station, a video station, magazine articles, the textbook or vertical files. For the purpose of the inservice, the facilitators use the CD-ROM station to demonstrate how computers can be used as a resource.

Clear and thorough student instructions have been prepared. The teacher will see how the students will access a



Clyde Cole (standing) and Paul Rose prepare their presentations for the teacher inservice

disc called "The Ultimate Human Body" and what information they will obtain through this process. "The Ultimate Human Body" is a multimedia CD-ROM title that contains information on human anatomy and systems of the body. The station instructions ask the students to identify the major structures of the male and female reproductive systems with the aid of a diagram, and explain the functions of each structure. The facilitators show how another aspect of the topic can be taught as they take the

teachers through a similar exercise at the laserdisc station. The teachers are then asked to design their own units that utilize various aspects of technology and later present their work to the rest of the group.

Clar Brown, the district coordinator for technology, is hopeful that the inservice days and mobile training facility will generate the desired results. Helping teachers become familiar and comfortable with this technology should make it easier for them to use it in their practice. When this latest round of inservicing is completed, the mobile computer training unit will be available to individual schools to help bolster their technology programs. The technology committee also hopes to make the unit available to other sectors in the community for human resource development purposes. Ω

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(ELEMENTARY continued from page 3)
wonderful new places at Kiddin' Around. This site is built especially for elementary school students and teenagers. Visit fantastic lands, go to spooky spots, go on a safari, or into a time machine. Kids will love the adventure.

In addition to the Elementary Homepage, other working groups have added "elementary" links to their homepages. The STEM-Net Science Homepage has a special page for elementary teachers. There you will find interesting WEB documents which provide thematic units for cooperative learning. Whales and Penguins are two that might be of interest. The STEM-Net Learning Resources Homepage lists the following sites of interest to elementary teachers: Midlink Magazine, International Kids' Space, Kid Pub (a place to read and publish stories), Sea World and Busch Gardens Animal Data Base, Yahoo (an information searching tool), Canadian Children's Museum, and many others.

While browsing, don't forget to access the STEM-Net Language Arts Homepage and check out the Writers' Network, a project to promote excellence in student writing and critical-thinking skills.

There are numerous sites which are invaluable to elementary teachers. During the new year, the STEM~Net Elementary Working Group will update their page. In the meantime, if you identify a site which you think should be added, please email one of the members of the group. Ω

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(ECONOMICS continued from page 8)
development to acquire appropriate professional credentials.

The graduate program will have a positive effect on the calibre of research coming from the Department of Economics. It builds on the existing body of applied economic research in Newfoundland and Labrador and increases economic expertise. It will stimulate new research specific to the needs of the province and draw attention to the province's potential. Graduates of this new program will be in a position to play a vital role in the economic restructuring of the province. Ω

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Electronic News Rooms

three schools in western Newfoundland are using technology to help students improve their skills



The editorial pages of "The Cox's Cove Chronicle" are filled with commentaries on current issues including violence on school playgrounds, the salmon moratorium, the seal industry and mining in Voisey's Bay. In subsequent pages, there are items on field trips, science experiments and winter carnival events. The newspaper is the creation of students in grades four to six in Cox's Cove Elementary school. It marks the beginning of a project designed to promote excellence in mathematics, science, computer technology and communication skills.

The collaborative efforts of three small schools in western Newfoundland have resulted in the setting up of electronic newsrooms to produce school newspapers. The three participants are A.J. Matthews Elementary school in Burgeo, W.E. Cormack Academy in Stephenville and Cox's Cove Elementary school in Cox's Cove. The project began in September 1995.

Each newsroom utilizes computer hardware and software to produce a conjoint tri-school newspaper. Students are assigned to different roles. Some are reporters for school subjects, others for school and community events such as sporting activities, winter carnivals and community council meetings. They use various resources, such as CD-ROM, networking through STEM~Net, journals and newspapers, to report on current issues within each of these areas. Sales managers deal with the local business community and in the process develop entrepreneurial skills. Editors bring the materials together to create a professional student newspaper which is written from the students' perspectives.

A computer committee has been established in each school. The members of these committees are responsible for designing the objectives of the project, setting up schedules and directing learning experiences based on the current curriculum. They play

a leadership role in training teachers, coordinating parental involvement and providing resources. All teachers are involved in the evaluation process which is based on the following indicators: quantity, quality and diversity of newspaper items; the focus on science, mathematics and technology; the quality of the research and use of resources; the use of STEM~Net; independence and organization demonstrated by students; and responses of students, teachers and community members.

The newspaper serves as a medium to develop and deliver an integrated curriculum. Students channel their knowledge of science, social studies, reading, mathematics and computer technology into a challenging and practical experience. The publication of a newspaper improves the information literacy skills of students, including word processing, desk-top publishing, data gathering, and information processing.

Tony Oxford, principal and coor-



Tony Oxford helps Vanessa Murrin with some editing for the next issue of "The Cox's Cove Chronicle"

dinator of the project in Cox's Cove Elementary school, explains how the project is integrated into the curriculum. "Students report on units they have just completed in mathematics and on science projects. They also include students' poems and short stories. There is a strong emphasis on language arts. Students go through the writing process in the preparation of articles. They learn to edit individually and in groups."

The following report on a science class was written by Dwayne Tarbett and edited by Sheena House for the "Cox's Cove Chronicle", (V1 N1).

SCIENCE WORK

In the Grade 5-6 class we have been learning about water drops and its effect on wax paper. We have been saying that a little droplet makes a word very large and blurry and a big droplet makes a word even larger and even clearer. Very over-sized and even larger drops have no effect at all. We've also been saying that the bending of light is called refraction. Refraction results from light entering an object with a different density. We learned that converge means to come together and diverge means to spread

apart. Sir said that white can be broken up into the colours of the spectrum. The colours of the spectrum are red, orange, yellow, green, blue, indigo, and violet. A glass prism can break up the colours of the spectrum. In the new chapter we are doing (which is Space) we have learned that space has absolutely no oxygen or gravity. Space has billions on top of billions of stars that no one has ever seen and probably never will see. Some people don't know it, but we know very very little about space.

Oxford notes that teachers are finding that the use of computers acts as a great motivator for their students. "The project is providing an avenue of opportunity for special needs students in particular", he says.

Computer technology also provides students with the opportunity to access the internet through STEM~Net, thus linking them with students across the province. STEM~Net will also be used to distribute articles to the three participating schools.

The project is benefitting from strong support from the community. The newspaper helps to keep parents

informed about what their children are learning in school and encourages parents to become partners in education. Copies are distributed to each family throughout the communities. Local businesses provide support by sponsoring pages in the newspaper.

The electronic newsrooms allow students to present what they have learned to a wider audience through a medium that is both challenging and exciting to produce. Ω

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The Provincial Professional Development Centre

working with teachers to meet their professional development needs

by
Charlie McCormack

In response to recommendations by the Royal Commission on Education, the Government of Newfoundland and Labrador has established the Provincial Professional Development Centre (PDC). An interim governing committee consisting of the heads of eight major education system stakeholder groups has been appointed and is now functioning in an advisory capacity until the new Teachers Training Act becomes legislation. In April 1995, a director and one professional development officer were appointed to staff the centre. The centre offered its first programs during the summer of 1995.

MANDATE

The mandate of the Provincial Professional Development Centre is to promote continual improvement and to raise the already high level of commitment and expertise of all those associated with the delivery of educational programs and services to

the K - 12 sector in Newfoundland and Labrador.

The mandate will be accomplished under the following guidelines:

- The centre will be an autonomous organization governed by a board of directors appointed by the Minister of Education and Training.
- The centre will perform the dual role of coordinating and delivering professional development programs to educators/education volunteers in the K - 12 system.
- To deliver professional development programs the centre will:
 - utilize permanent staff
 - second short and long-term positions
 - broker services with other agencies
 - contract programs to individuals and institutions.
- The centre will offer programs in response to ongoing needs assessments which identify the profes-

sional development needs of the K - 12 system.

- The centre will liaise with the Teacher Certification Board and other educational agencies on professional development programs offered by the centre.

GOALS

The goal of the centre is to lead schools and districts in Newfoundland and Labrador to become what Senge, Leithwood & Fullen call learning organizations. This requires creating a culture of continuous learning and excellence in education. Professional development must be designed and delivered in the province to allow teachers the opportunity to become lifelong learners. Continuous professional development of educators is crucial if the recommendations of the Royal Commission and other education innovations are to be successfully implemented throughout Newfoundland and Labrador.

CHALLENGES

There are many factors in education that are beyond the control of the classroom teacher. However, teachers are in control of their own professional development. The challenge of the centre is to provide the opportunity for meaningful professional development for educators at times and locations accessible to all. Successful professional development programs are essential in a society that is becoming increasingly complex. Educators are not faced with implementing only one major innovation at a time, but rather, with managing multiple innovations and demands for change simultaneously. In Newfoundland and Labrador, educators must adapt to innovations including school councils, school assessment, teacher certification, curriculum reform, revised high school program, learning outcomes, technol-

ogy, performance indicators, inclusion, cooperative education, block scheduling, block funding, staff training and others. Only a confident and adaptable learning organization can thrive in such a dynamic and complex environment. Recognizing the ever increasing demands placed on

What students need to know in the modern world is expanding and becoming more demanding; therefore, teachers need to develop their knowledge and skills to meet the learning needs of students. If teachers are not actively engaged in their own learning throughout their careers, they cannot make learning exciting and meaningful for their students.

To ensure teachers can engage in continuous growth there must be cooperation from all levels of the education system. Coordinated efforts will result in professional development that is responsive to the needs identified by educators in the entire system. A culture of collaboration and innovation must link all goals and activities of the system to all members of the education community. There must be an integration of individual and organizational priorities that has the end result of improving achievement in the classroom. Teachers must be responsible for developing their own professional learning and the Provincial Professional Development Centre must provide ongoing, multi-dimensional opportunities for teachers to increase their knowledge and skills. Inevitably, student learning and professional development for teachers go hand-in-hand.

STRUCTURE, STAFF AND OPERATION OF THE CENTRE

The Royal Commission Report, *Our Children, Our Future*, recommended that the Provincial Professional Development Centre be administered and financed jointly by the Department of Education and Training, school boards, the Newfoundland and Labrador Teachers' Association and the Faculty of Education of Memorial University (Recommendation 71).

The second recommendation concerning financing is currently under discussion. To date, the provin-

What is unique about this centre is, for the first time, there is an organization devoted to focusing, delivering and coordinating professional development in response to needs identified by teachers, principals and other educators.

educators in a rapidly changing world, it is essential to support the professional growth needed for teachers and administrators "to work smarter, not harder."

In addition to dealing with the mandated changes, today's teacher must possess a wider and deeper knowledge base than in the past.

cial government and Memorial University have contributed to the operation of the centre. The province is providing staff and operation funding. Memorial University is providing facilities, utilities and janitorial services. The centre is now housed on the third floor of the G.A. Hickman Building, Memorial University, St. John's. In addition, the COOPERATION Agreement on Human Resource Development has provided resources to help with start-up costs and funded six summer institutes conducted by the centre in 1995.

While the Provincial Professional Development Centre is housed at Memorial University, it will operate under a decentralized delivery structure with emphasis on delivering programs to areas of greatest need, at times and locations most suitable for participants. The seven summer institutes offered in 1995 provide a model of delivery that will be followed in the future. The centre offered one-week institutes in Technology, Multi-Grade Teaching, In-school Leadership and Legal Issues in Education. The training was held in Corner Brook, Grand Falls, Gander, Port Blandford and St. John's. All institutes were facilitated by educators who live and work in the province.

In addition to a decentralized delivery structure, the centre will be administered by a small core staff. Currently, a director (Charlie McCormack) and one professional development officer (Dr. Georgina Hedges), are responsible for developing and coordinating all operations and programs for the centre. Nancy Pike is the centre's secretary. As the centre assumes more responsibility for professional development in the province, additional officers will have to be added to meet anticipated demands. However, for the most part, the centre will operate with a flexible staffing strategy utilizing both short

and long-term secondments and by contracting individuals or institutions to deliver programs as determined by the needs of the education system.

To determine what programs are a priority for professional development, a province-wide needs assessment will be completed in January 1996. The assessment will survey over 900 educators from all regions in Newfoundland and Labrador. When the needs assessment is completed, the centre will be able to identify, on a district basis, what professional development programs educators want delivered in their area. The centre will plan, prepare and coordinate with all the education stakeholders to deliver high quality professional development to all regions of Newfoundland and Labrador.

The task of the Provincial Professional Development Centre, as expressed in the mandate, is to promote continual improvement in the education system. This is not a new concept. Educators in this province are among the most dedicated and highly educated in Canada. What is unique about the centre is, for the first time, there is an organization devoted to focusing, delivering and coordinating professional development in response to needs identified by teachers, principals and other educators. The centre will provide a powerful vehicle for those educators engaged in continuous learning. The activities of the centre will focus on providing opportunity for continuous development of all educators in the K-12 system with the end result of improving the quality of children's learning in the classroom. Ω

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Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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COOPERATION



The COOPERATION Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the needs of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community and enterprise education, as well as provide programming for high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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Prospects

The Journal of the Canada/Newfoundland
COOPERATION Agreement on Human Resource Development



Opening Access
to Learning.

Prospects

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Opening Access to Learning

We spoke, then we wrote, then we used the printing press to mass produce what we wrote and now we have information technology. A short history of humanity's evolution in communication, but one that alludes to four major achievements in our journey forward; four steps that have everything to do with opening access to knowledge. Spoken language gave our early ancestors the ability to convey information about their environment, tell stories and build the rudimentary constructs for social order. Written language gave some permanence to the information passed by word of mouth. Gutenberg's printing press made it possible to reproduce information in quantity so it could be spread to more and more people. Our technology is again at a stage where another revolution in communication is occurring. How we direct the forces of this revolution is crucial, especially in the critical early stages of development.

This edition of *Prospects* deals with some of these issues as we explore the innovative ways educators have put this new technology to good use. The delivery of educational services is a key issue. In "Open Learning's Window of Opportunity,"

we discuss some of the initiatives being undertaken by the Open Learning and Information Network. "Expanding the Boundaries", "Improving Their Image", and "Open Learning and Health Care" describe various ways educators are employing new technology to deliver educational services to the learner. "STELLAR Schools" and "The School RINGS Project" describe some of the instructional strategies that are being used to enhance teaching in K to 12 with the Internet.

A project will soon be underway to upgrade 60 learning sites throughout the province with multimedia computers. The computers will give the existing facilities the capability to create, pilot and maintain new distance programme offerings. "Multimedia Language Centre", "Prototype Modules for Open Learning in Mathematics and Science", and "Multimedia Teaching Strategies for the Open Classroom" explore projects that deal with enhancing curriculum through the use of multimedia technology.

Of the issues being debated in light of our new technology, significant concern is being expressed for the quality of instruction provided to the learner. The World-Wide-Web

(WWW) is growing exponentially and educators recognize that meaningful evaluation of materials and courses offered over the WWW is essential. Wise planning is helping us feel at home in the vastness of our new information technology. Good planning and careful implementation of programs will help us fulfill the seemingly limitless potential offered by this latest step towards opening access to learning.

Trudi Johnson
Albert Johnson
(editors)



The next issue of *Prospects* will deal with partnerships and human resource development. Please send submissions on these or other topics relevant to human resource development to the editors at the address found on the last page. Your submissions will be carefully considered for publication.

DIRECTORY ASSISTANCE

Intermediate Resources on the Web

accessing points of interest
for junior high teachers

by
David Stoodley and Albert Johnson

The current trend in computer/human interfaces allows the user to point and click rather than read through pages of text. If you are navigating through the STEM~Net homepage and want to browse the Intermediate homepage, the steps listed below may help.

Once you have used Netscape Navigator to access the STEM~Net homepage (<http://calvin.stemnet.nf.ca>), you would choose Curriculum Resources. Then choose Intermediate. You should now be looking at the Intermediate Homepage. As you can see, there are 6 items on this page that you can select to take you to a variety of sites. If you select Curriculum you are then given the option to choose a specific curriculum area to browse related sites.

Under Language Arts you will find a link to the Fiction Homepage. This page contains a collection of on-

line novels and short stories and a link to Guide to Literature on the Internet. The Works of the Bard takes you to a collection of Shakespeare's work. Electronic Texts links you to a collection of on-line journals on various topics.

Links under Mathematics at the curriculum site will take you to the Mathematics Homepage. From there you can access information on geometry or problem-solving. You can also access collections of problems and questions.

Interesting Sites provides links to a number of well-developed and informative Web sites. The Cool NASA Site of the Week will take you to one of the many NASA Web sites. Ocean Planet is a link to an exhibit at the Smithsonian on environmental issues affecting the health of the world's oceans. Other links on this page take you to the United States Department

of Health and Human Services, the Center for Disease Control and a homepage dealing with alternative medicine.

The Intermediate page is not the only area where you will find resources. Accessing the Susie homepage (<http://susie.stemnet.nf.ca>) from the STEM~Net page will lead you to some interesting information and projects. During the month of April, students will be able to participate in the Trans Canada Information Highway Newsline. A class in each province will act as editors for an on-line newspaper. This class will be responsible for receiving and editing submissions from students in their province and preparing a homepage to display the final version. Submissions will be accepted from junior high students throughout the province.

These are just a few of the interesting and informative sites available on the Web. Click the Mailbox on the Intermediate resource page if you want to send an email message to the development team or a specific member of the team. Suggestions are welcome and you are encouraged to identify sites that you feel would be valuable additions to the Intermediate homepage. Ω

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Technology in Education in International Perspective



by
George Haché

Technology Education is a subject area that has become increasingly conspicuous in the curriculum used in elementary, secondary, and post-secondary schools. Evidence of the vitality of this area as not only a teachable subject area, but also as a focus for discourse among researchers was most evident at a recent conference held in Jerusalem. *The Jerusalem International Science and Technology Education Conference: Technology Education For A Changing Future: Theory, Policy And Practice* was held in early January 1996. The following paragraphs are excerpts drawn from conference sessions, personal impressions of deliberations, and concluding remarks abstracted from the conference closing paper entitled "Technology Education: An Agenda for Further Progress".

The conference attracted over 1000 participants, including Ministers of Education from 28 nations, educators and researchers from more than

80 countries and a large group of teachers from the local area. Organized by the nation of Israel and the United Nations Educational, Scientific and Cultural Organization (UNESCO), the conference was a four-day "packed event" that started with pre-conference workshops on a variety of "best practices" in technology education world-wide. These were followed by paper sessions that featured presentations from both educators and researchers, poster displays of various academic ventures, and debates of policy used to govern a growing international organization representing technology education professionals in the field. As well, displays from textbook and equipment vendors and an appropriate sample of tours to area schools and cultural sites were included.

At a conference on this topic and with this international representation one might anticipate wide agreement on the need for technology in education but diverse opinion regarding

details of implementation. This provided the opportunity to compare and contrast individual views. The discussion was lively. It was through these deliberations that the international delegates were able to further define what constitutes meaningful technology education while providing description of contemporary examples found in each of their countries.

As in previous technology conferences, events arise to underscore the importance of the conference theme. Often these events are associated with the drama that is unfolding in the host country. An example of such an event was provided by Shimon Peres, Prime Minister of Israel. His address to the delegates focused on the growth of interest within his government for increasing levels of technology in general education and training. Outlining the historical development of his nation, he identified social and economic milestones that contributed to his government's rationale for increasing the emphasis on "technological capability". He pointed out that ensuring the economic and political security of his nation is dependent on technological capability, and concluded by indicating that his government would increase expenditures in these fields to match expenditure levels traditionally allocated to military defence. Clearly an aura of immediacy was introduced, particularly when one reflects on the drama that unfolds daily in this region of the world. This sense of urgency prevailed for the duration of the conference.

No less dramatic were the messages that emerged from small group reports presented by conference delegates. For example, a paper session by a representative from Kenya, Dr. Ahmed Ferej, outlined the programs that are being

implemented to assist the "non-organized sector" tradespersons in Kenya to become more responsive to technological change. As Kenya struggles to acquire the necessary technological capability to sustain a viable economy, the ability to introduce change is being perceived as adversely affecting the economic integrity of small unorganized units, diminishing their ability to conduct enterprise. In Kenya these units constitute the major employment backbone in rural communities and are the foundation of most trade and service areas. They are comprised of individually owned small family units where technological skills are acquired, in most instances, after a minimum of formal training that is usually handed down from business owner to the young worker in an informal apprenticeship arrangement. More deliberately, exposure to new training methods is seen as vital to this sector's economic vitality.

The drama was apparent through Dr. Ferej's description of the methods that are being developed to draw non-organized sector proprietors into training opportunities. Training needed to be adjusted to acknowledge the fact that many had neither received previous training nor were inclined to see value or need for technological change. H.K. Gill reported on strategies that are in use in large population centres in India. He also addressed the need both to protect the social vitality that sustains on-going economic enterprise in these

small unorganized units, and the need to build the skills of a workforce. In other sessions, representatives from more affluent nations reported on research and development that focuses on the latest technological capability to meet the training needs of individuals who live in remote

"The quality of life afforded by a society is directly and positively related to the extent to which its people understand and effectively use existing technology..."

The teaching and studying of technological concepts, issues, attitudes and skills, should be planned and implemented as a progressive continuum that extends through all levels of the educational system..."

regions or are impeded by various barriers to learning.

Thus the messages from the conference began to emerge. Technology in education was linked to social and economic determinants and to individuals' right to learn. Its growth in education was viewed as an inevitability if not a necessity. The argument for support of technology in education was grounded in research findings, and perceived outcomes and opportunities that arise differently in the delegates' countries. Agreement on the parameters of the extent of technological presence in education became more evident with the release of the final conference paper. Two recommendations included in that paper are:

- "The quality of life afforded by a society is directly and positively related to the extent to which its people understand and effectively use existing technology, as well as creatively develop new technologies, while taking into account key scientific, economic, social and ecological aspects.
- The teaching and studying of technological concepts, issues, attitudes and skills, should be planned and implemented as a progressive continuum that extends through all levels of the educational system (elementary through high school)

and beyond, as an integral part of an "education for all" initiative as well as more specialized education."

Not unlike the increased sensitivity to, and greater use of, technology in curriculum that has become apparent in other nations, developments in Newfoundland and Labrador are worth noting, particularly as they relate to teacher development. Changes to the Technology Education Diploma Program at Memorial University of Newfoundland, for example, largely reflect the views that are evident in the international profession. New facilities are being developed in which teachers can critically examine technology in learning while acquiring new skills. With funding and support from the COOPERATION Agreement on Human Resource Development and Memorial University, the Faculty of Education has been able to refurbish old industrial arts and science laboratories to build a state of the art Technology and Science laboratory (scheduled to open in early summer 1996). It will provide the province's teachers with an opportunity to acquire advanced levels of technical knowledge while examining the pedagogical and andragogical implications of technology in learning.

Similar to developments in other nations, an expanded opportunity for

post-secondary educators and trainers has also become apparent in the Faculty of Education. A recently approved Masters of Education option for post-secondary educators will cater to their specialized needs. These recent developments provide educators of the province with a resource to further explore the many curricular opportunities and questions related to technology in learning, teacher development, epistemics in training for employment, and the age old philosophies inherent in acquiring a means to make a living. Who says we are behind! Ω

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Open Learning's Window of Opportunity

Open learning got a boost early this year when the federal and provincial governments confirmed initiatives to be implemented under a five-year, \$100 million Economic Renewal Agreement for Newfoundland and Labrador. Funding has been allocated to help integrate network and distance learning resources, to expand and continue the work of the Open Learning and Information Network, and to develop and commercialize new media learning products that originate in this province.

This is a timely investment that acknowledges the strategic importance of advanced technologies and the role they can play in extending the reach of education and training cost effectively and efficiently. The Agreement is specifically for economic renewal, and signals that activities will be expected to demonstrate the kind of long-term potential and sustainability that will prepare the province for the next millennium. The "Distance Education and New Media Learning" component presents unique opportunities to harmonize the province's distance learning infrastructure and build partnerships to develop, use and export learning products.

The broad objectives of this com-

ponent are those which the Open Learning and Information Network consortium identified as key to its own strategy in its formative phase throughout 1994. Erin Keough, OLIN's Executive Director, hails news of the allocation as "an opportunity for those of us involved in the use of new media to support learning and to build significantly on what we've achieved so far. Coordination and cooperation are going to be more important than ever, because we can't expect more government funding to follow this."

Like her partners in the OLIN consortium, Erin is ready for the challenges. The first year of OLIN's operation has been a planning phase. Planning is crucial, because the move to an open learning culture involves real change for institutions, for educators, and for students. Much effort goes into making change transparent and reasonable: such things as one-on-one communication with partner organizations; detailed consideration of alternatives for collaboration; negotiations to commit resources; information sharing; and working out compromises among elements which often overlap and sometimes conflict.

It helps that in her spare time, Erin is President of NATI, the Newfoundland and Labrador Alliance

of Technical Industries. In this capacity she is frequently in contact with private sector network administrators and software developers, people who will be key to building integrated systems and good learning products. A long-standing member of the Canadian Association for Distance Education, she also works on policies and projects with the international community. These connections will be valuable as the province develops products that can be exported, and OLIN's agenda for 1996 specifically includes developing international markets.

OLIN, itself a change-agent, is operating in a climate of unusual change. Other projects on the go that will help create an open learning culture in Newfoundland and Labrador include: developing a common Atlantic Provinces' curriculum at the high school level; sharing distance education courses at the university level; rationalizing the regional college system; implementing Operation ON-LINE's plan for the province's information sector (the name means "Opportunities for Newfoundland and Labrador in the New Economy"); building a provincial information "backbone"; negotiating special long-distance rates for education; articulating courses through various levels of

the education system; implementing prior learning assessment and accreditation; and changing apprenticeship training.

Each of these will affect how learners learn, and each has implications for how OLIN will mature. With all this in its "Action" and "Keep in View" files, and with only a director and part time secretarial assistance, since September, 1995, OLIN and its partners have also developed five pilot projects and launched three of them.

The OLIN Board recommended and the Council on Higher Education approved five pilots for the 1995-96 workplan. The principles guiding these projects are as follows: 1) they should build partnerships across jurisdictions; 2) they should represent exemplary program design; 3) they should result in practical distance learning products.

As its flagship project, the Board recommended that OLIN commence developing a complete regional college program in distance format, integrating delivery on the Internet and the use of World-Wide-Web resources. A sub-committee representing OLIN, Central, Eastern and Westviking Colleges, Memorial University (Faculties of Business and Computer Science, and TETRA) and the Curriculum and Learning Resources Division of the Department of Education accepted this challenge.

They decided to focus on the Business Skills program, and to begin with the two courses, Organizational Behaviour 1310 and 1320. These courses appear in nine different programs of study at the college level. They are equivalent in content to Memorial University's Faculty of Business Administration course, Organizational Behaviour 2301, which has already been developed for distance delivery in a correspondence mode augmented by teleconferences.

The college and university courses have been articulated, but the issue of assessment suitable to both college and universities has not been addressed. Consideration is being given to articulation with the high school Enterprise Education program, and with Advanced Placement status for the post-secondary sector. Initially, the curriculum for the college level will be addressed. The levels of effort, degree of complexity, and blend of technologies best suited to support the three client groups must be identified.

The innovative element in the design and delivery of these courses will be the use of computer-mediated communications over the World-Wide-Web. Eastern College has provided access to its server and has offered to oversee the student administrative functions. A proposal for funding for the design of these courses has been approved by the COOPERATION Agreement on Human Resource Development.

A second pilot project addresses the need for high school and university level physics modules suitable for delivery over the Internet, to support live interactive use in the classroom. This pilot is a partnership between OLIN, Kenneth McKay of Memorial University's Faculty of Business, and the School for the Deaf. McKay will develop twelve modules which will focus on abstract concepts difficult to teach and to learn. (see page 19).

Two other pilots have been developed internally and funded from OLIN's operating grant. Designing courseware for the Internet is an emerging specialization, and one which begs to be addressed in a collaborative and collegial mode. On February 29th and March 1st, OLIN hosted a workshop for eighteen course designers on "the use of the World-Wide-Web/Internet to facilitate an effective learning environment".



Erin Keough, Director of the Open Learning and Information Network

The Advisory Board of the Open Learning and Information Network

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Provincial Public Libraries Board

Sharon Duggan
Newfoundland Telephone

Dean MacDonald
Cable Atlantic

Wayne Oakley
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Steve Quinton
Eastern College

Jaap Tuinman
Memorial University of Newfoundland

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Attendees represented four of the five regional colleges, the Institute of Fisheries and Marine Technology, the Department of Education and Memorial University. Elizabeth Burge, from the University of New Brunswick, led wide-ranging conceptual discussions about design and student support. Dan West (in person) and Peter Holt (on-line) from Athabasca University led participants through a variety of design resources on the Web. Rod Byrne of Memorial University's Faculty of Computer Science developed the Web page used for pre-conference planning among the participants, and has taken responsibility for keeping this link going for further collaborations. He also gave a presentation on the authoring program, "Hot Java". Allyson Hayjek gave a presentation on design issues for Web page construction. Other workshops are likely to follow this successful venture.

OLIN has also launched a Web page for Open Learning in Newfoundland, as an internal pilot. This is a work in progress and temporarily may be found at http://www.wordplay.com/open_learning_nf. Partners in the OLIN consortium and others involved in distance or open learning in this province who do not find links to their own homepages in this document are welcome to email their correct Web addresses to OLIN. Wordplay has done the initial design work in partnership with OLIN and it is anticipated that OLIN will update the material regularly.

The final pilot is a venture with a variety of institutional and private sector partners. Initiated by Data Services International (DSI), its objectives are to provide opportunities for high school students in small rural schools to: enhance searching and communications skills on the World-Wide-Web, broaden their awareness of the use of computers and

computer networks outside school, learn about the economic opportunities and constraints of their region, and research the potential for a variety of careers which they might pursue in their region.

DSI will lend computers to sites in four rural communities, to support a nine-month extracurricular pilot, and will provide a coordinator to train the student participants and monitor the projects. Though participants will be chosen and monitored by the teaching staff in their school, the computers will be based in a community centre or business rather than in the school, to introduce the students to a working culture. Ten private sector professionals, representing the financial sector, medicine, software development, total quality management, aquaculture, geographic information systems, architecture and engineering have volunteered to spend an hour or two weekly on-line, to respond to students' questions about the career specialities they are researching. Supporting trades and occupations will be studied as well as professions. Key to the research will be identifying occupations which can be followed in the province, and preferably in a student's own region. The students will compile their research into a CD-ROM which DSI has undertaken to produce. The project has received funding from the COOPERATION Agreement on Human Resource Development and is now in progress.

Over the past year OLIN has also compiled an inventory of information about the technology and human resources which public institutions in this province now dedicate to distance learning. Erin has held focus groups with instructors, to discuss issues such as support mechanisms, the balance between individual and site activities, the balance between electronic mediation and other

media, and their costs, and the potential of electronic libraries. In cooperation with a consultant, she has developed a proposal for an evaluation framework for all the pilot projects. The results of this research and evaluation promise to establish firm principles on which to build future open learning initiatives.

In the light of promised incremental resources, Erin adds a few sound economic principles to the pedagogic and andragogic ones she has been pursuing rigorously: "There will be new opportunities to create jobs and wealth. We'll have to make the most of them. OLIN will focus on partnerships to build projects that work here in the province, and also work in the export market." Ω

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Expanding the Boundaries

taking advantage of the Internet and World-Wide-Web to improve access to education

The Internet and World-Wide-Web (WWW) have great potential as human resource development tools. Many institutions and government departments are experimenting with a variety of methods and models for administering this powerful new medium. For some Newfoundlanders and Labradorians, the Internet plays an important role in their education.

Paul Smith teaches courses in computer studies at Menihek Integrated High School in Labrador City and is enroled in a doctoral program in Computers in Education at Nova Southeastern University in Fort Lauderdale, Florida. The program requires that Smith complete courses and a thesis. He works on the course requirements at his home in Labrador City via the Internet. During the winter 1996 term he worked on two courses, Research Methodology and Learning Theory.

Classes are held in an "electronic classroom". At the scheduled time, Smith and his classmates sit in front

of their computers and log on to the Internet. They connect to Nova Southeastern and participate in the class. The professor has control over the top two-thirds of the screen while the students are given an opportunity, at various times in the class session, to type questions and comments in the bottom one-third of the screen. "It's an interesting way to go to class," says Smith. "The professor presents material on the top two-thirds of the screen. When I finish reading it, I press esc-Q which lets him know that I've completed that screen. Esc-A electronically raises my hand. A question mark appears by my name on the class list on the professor's monitor and I'm given control of the bottom one-third of the screen."

The scope of the class enrolment is impressive. Some of Smith's classmates attend class with him in front of their computers in Germany, Israel, Taiwan and Hong Kong. Students share ideas with their professors and each other, ask questions and submit assignments via email. Smith, who

completed the requirements for a Masters degree at Nova Southeastern using this method, is pleased to be able to have this opportunity. "Being there is the preference," says Smith. "But if I couldn't work on the program this way, I simply wouldn't be able to do my degree."

Memorial University is also experimenting with delivering courses over the Internet. Michael Collins of Memorial University's Biology Department is offering the non-laboratory biology course, Modern Biology and Human Society I, through the WWW for the first time during the spring semester of 1996. The course examines the implications of modern biological research on human beings and explores topics such as cancer, diet and nutrition and associated diseases, immunity, genetic engineering, and reproductive engineering. The course is organized into 12 weekly self-contained units. Students complete a computer-administered multiple-choice test at the end of each unit and submit their responses via the Internet. They also write mid-term and final examinations.

The text for the course and other materials such as diagrams are available on the WWW. Future offerings of the course will be enhanced by animation and video clips on various course topics. Collins also hopes to use the vast resources of the WWW by providing links to Web sites that offer more information on the topics covered. He hopes this will encourage students to delve further into the topics presented. The students will be encouraged to ask questions, share comments, and participate in class discussions via email. Collins is pleased with the students' response to the idea. The twenty-five places available for the spring offering filled quickly and ten students are on a waiting list. Ω

Improving Their Image



Memorial University and the province's colleges experiment with satellite technology

The Clarenville Project provided the first opportunity to offer distance education courses in real time via two-way interactive video (*Prospects*, V2N2, page 15). Instructors in St. John's interacted with students in Clarenville, each being able to see and talk to the other. Six telephone lines were used to carry the signal to Clarenville and six lines carried the return signal back to St. John's. The Regional College Satellite Project is a natural progression from the Clarenville Project.

The Clarenville Project was successful. Students' results and opinions indicated that this use of technology is an effective method of delivery. However, it was not economically viable to expand to more sites using the technology employed in the experiment. Point-to-point distance education in real time using telephone lines for two-way video is not cost-effective. "We learned some important lessons from the Clarenville experiment," says Craig McNamara, director of the Division of Educational Technology. "We realized that the signal going out to the students needed to be better quality,

but the signal returning from the students need not be the quality that we were using. This led us to believe that using a wide band satellite signal out to the students and the new CUSEEME Internet video connections for the return image would make the concept cost-effective if enough college sites are involved."

Real-time interactive, two-way video is the primary communications method. The Satellite Project, however, will utilize broadcast quality satellite transmission for the video directed to the students (outgoing) and lower quality Internet CUSEEME video technology for the return signal from the seven regional college sites. This model provides an extremely high quality signal for the actual instruction, with the lower quality signal providing adequate feedback from the students. The model was developed through observation of the instructor/student interactions during the Clarenville Project.

Multiple sites must be involved if real-time, interactive two-way video systems are to be cost-effective. Currently, there are seven sites offering first-year university courses as part of the Memorial University/Regional

College program. Five interactive video distance education courses are being offered to these sites.

Economics 2010 (Introduction to Microeconomics) and Economics 2020 (Introduction to Macroeconomics) are required courses for acceptance to Memorial's Faculty of Business Administration and are available for the first time for delivery to the regional colleges. Geography 1000 (Introduction I) was revised and adapted for delivery using the new system. The two first year Psychology courses are also being offered.

This model has a dramatic impact on budgets. The capital equipment required at each site is approximately one-half of the cost of the capital equipment for the Clarenville Project. Further, no significant new capital equipment was required at Memorial University. If the Clarenville model was expanded to five additional sites, capital costs would approach \$500,000 in the field with approximately \$400,000 being required on-campus.

The Clarenville Project costs approximately \$100 per hour in communications line charges. This cost would be applicable to each addition-

al site. To expand the Clarenville model to seven sites, communications charges would be \$700 per hour. Satellite communication charges are approximately \$550 per hour regardless of the number of sites involved. Even though the cost per-hour of the satellite is far more expensive than individual sites utilizing telephone technology, the aggregate costs of the telephone technology exceed the cost of satellite charges. If additional sites are added in the future, the satellite model becomes even more attractive. The return signal adds no additional cost to the project because it takes advantage of existing Internet connections. If the model used in the Clarenville project was extended to 10 sites, the cost would be \$1,000. The satellite could be extended to 10 sites and the cost would remain \$550.

Broadcast satellite video is being used to deliver the instruction and course materials to the students, while the return video will utilize Internet CUSEEME technology. This technology is part of what is described as the 'converging technologies' and will provide opportunities for continuing consultation and cooperation between this project and the Open Learning and Information Network, the Telemedicine Centre, STEM~Net, NLNet and others.

New technology is making the satellite option even more viable. Digital processing is now being integrated with satellite transmission. The capacity of each satellite transponder is being increased by four through this process. This has the potential to dramatically lower the cost of satellite delivery while, at the same time, provide a more stable signal. The same techniques are being applied to the process of delivering the video signal to the satellite. Digital uplinking means that two or more broadcasters can share the same uplink, again reducing the cost. The Division of



Students at the Labrador West Campus of the Labrador College are taking Economics 2020 via satellite from Memorial University

Educational Technology is exploring this option with local private and public broadcasters. The cost saving would be significant and a shared digital uplink would eliminate concerns regarding the dependability of the Division's twenty-three year old uplink.

Student response to the new method of delivery has been positive. Dwayne Dinn is a student at the Labrador West campus of Labrador College. He has completed distance courses via correspondence, teleconference, and two-way video. "Of the three methods, I much prefer the two-way video," says Dinn. "I miss the interaction of having a professor in the classroom, but the two-way video method is the next best thing." Sharon Kent is the class monitor in Labrador City and oversees the technical aspects of the system at that location. "The students are responding well to the satellite delivery method," remarks Kent. "The technology is very reliable."

Once the system is in place it can be used for many other initiatives. Delivery costs for projects such as

training programs, technology courses, special seminars or other activities should continue to be similar to the preparation and delivery costs encountered in this project. Ω

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The School RINGS Project

an exercise in world-wide collaborative learning



by
Beth Power

One theory about human learning suggests that learning involves many interconnected pieces of information. New pieces of information get added to this connected set of ideas and become interrelated to the information that is already there. This forms one massive web of ideas. In a similar way, we surf through the World-Wide-Web (WWW). We respond to the stimuli that interest us. This leads us to related information that becomes integrated as personal knowledge. Not only can the WWW be used for personal interest, but also as an educational tool. In today's classrooms, the emphasis is no longer on rote memorization but on the ability to access information. The amount of information that can be obtained through the Internet is staggering and is a resource to which students should have access. SchoolNet RINGS is a program designed to help teachers integrate the Internet into the curriculum. RINGS is an acronym for Reports and Investigations by Networked Groups of Students. It was developed and is administered by STEM~Net and is funded and supported by Industry Canada's

SchoolNet program.

A RINGS Project is made up of groups of students from Newfoundland and Labrador. These students sometimes interact with students in other parts of the world. Students work together in groups on an on-line project. The work required is divided up into sub-tasks which are distributed among participating teams. Regular networked-based consultations and discussions among the groups occur throughout the project. Teachers who do not have much experience with the Internet need not be daunted by the technology because help is readily available. An experienced teacher designs the project and is responsible for it as the RINGS leader.

RINGS started in the 1994-95 school year with The Class Project Network which offered postcard email, gopher database, a few newsgroups and file/directory services. This year, students have full Internet access with postcard email, many more newsgroups, and full WWW capabilities. There are currently 59 projects representing many subject areas with 216 classes registered from K to 12 and over 6000 students par-

ticipating.

"Travel Newfoundland and Labrador" was designed by Judy Cooper at St. George's Elementary School in Conception Bay South. This project helps students become more aware of the uniqueness of their province and it relates directly to the primary and elementary social studies curriculum. Groups of students at different schools compile and publish information about some aspect of their own community in order to create an interesting Internet travel brochure about communities in Newfoundland and Labrador.

Students exchange information about their lifestyle and environment. (See <http://www.stemnet.nf.ca/Schools/CBS/StGeorges/ringsproj/index.html>)

"The Newfoundland and Labrador Writers' Network" is coordinated by Ted van Nostrand and Anne Butler from Holy Heart of Mary High School in St. John's. Funded by the COOPERATION Agreement on Human Resource Development, this project allows students from K to 12 to publish their poetry and prose online. It also uses student collaboration to foster excellence in writing within all grades and communities of the province. Young people are connected and motivated through their common love of writing. The project was developed in the 1994-1995 school year by a team of teachers from the Roman Catholic School Board for St. John's and has been set up for participation by teachers and students throughout the province. The project uses RINGS to form a network of young writers who work in collaboration with other students and teachers to produce high calibre writing. The best of this work is published in Windows, a student literary magazine which is accessible in both print form and through the WWW. (see <http://calvin.stemnet.nf.ca/~evannost/windows.html>)



Michelle Jenkins and Judy Cooper work with their grade 3 students on the "Travel Newfoundland and Labrador" project at St. George's Elementary School in Conception Bay South

"Roots" is administered by Heidi Gatherall of Newtown Elementary. The Social Studies curriculum for grade six in Newfoundland and Labrador focuses on aspects and issues of our Canadian culture. Included are issues such as national unity, Quebec separation, and our Canadian mosaic. Settlement patterns, regional isolation, ties to country of origin, are just a few of the factors which affect Canada's multicultural mosaic. By communicating with parents and grandparents, discussing family and national traditions, and sharing them with other 11 or 12 year olds, these students will be able to gain an appreciation for family and country. Stories, songs, customs, or artifacts may be collected and displayed on the WWW.

The "Wilfred Laurier Stock Market Competition" is a high school competition administered through Sir Wilfred Laurier University in Ontario. It is a Canada-wide stock market simulation in which teams of students invest a hypothetical \$100,000 in companies of their choice. Students use the Internet to access the latest stock quotes, and

various sources of information about the stock market as well as advice on buying and investing, short selling, stock promotions, and penny stocks. The competition takes place from February to April every year and the students who have made the most money at the end of the competition win. Students from Gander Collegiate have won three times for the Atlantic region and Glovertown High won last year's national championships.

The potential of the Internet and SchoolNet RINGS is boundless. Internet-based projects allow students in remote locations to increase their learning potential. Soon, STEM~Net will have the technology to support video-conferencing, animation, and sound, using existing equipment. As the increased bandwidth becomes available in some schools, students will have greater access to Internet services as well as full-motion live video. Imagine students being able to control a robot like the Canadarm and perform a task many kilometres away. Imagine a biology teacher showing three-dimensional models of the human body, much like MRI (continued RINGS on page 22)

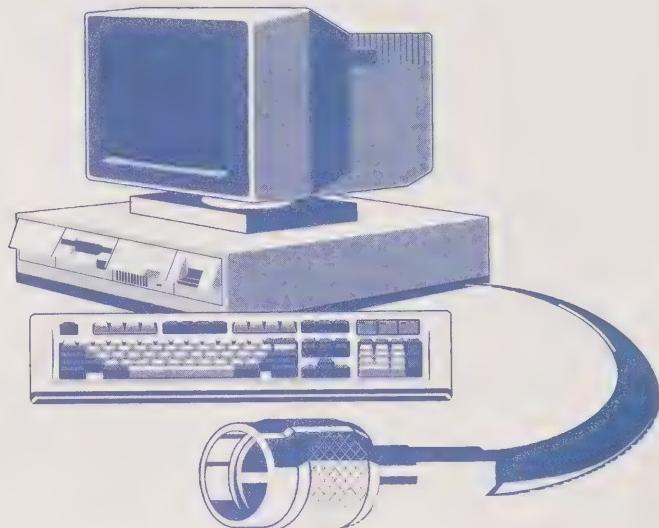
STELLAR Schools

bringing high speed Internet connectivity to one-third of the province's schools

by
Nancy Parsons Heath

STELLAR Schools is a high-speed educational networking project, initiated under a partnership between Cable Atlantic and STEM~Net. This initiative makes use of Cable Atlantic's expanding fibre/co-axial broadband cable network to offer 4 Mbps Internet connectivity to all of the schools in Cable Atlantic's interactive network service areas within three years. The shared 4 Mbps connection will allow school networks to link to the Internet at a speed that will not only allow Netscape access from all workstations, but will also allow the transmission of video, sound and graphics in a full multimedia networking environment.

Administration of the project is carried out by the STELLAR Schools Advisory Council, which includes representation from school boards, teachers, parents, students, Memorial University's Faculty of Education, Public Libraries, the Department of Education, Cable Atlantic and STEM~Net. This board provides advice to STEM~Net, Cable Atlantic and participating school boards on policy related to the project. The



Council is also responsible for approving projects and holds the final say about a school's qualifications to participate as a STELLAR School.

The STELLAR Schools Agreement, which must be signed by Cable Atlantic, STEM~Net, the school board and the school involved in each case, outlines the contributions and responsibilities of each of the partners. Each participating school will have free access for a period of four years. Schools will pay a modest hook-up fee and will be responsible for the required school-based equipment, as well as for ensuring acceptable use of the network connections that are provided to them. Schools are also required to submit proposals to the Advisory Council for three curriculum-related networking projects in each of the four years of the agreement.

Two schools have their connection to the Cable Atlantic network in place. Prince of Wales Collegiate and E. Vaters Collegiate, both in St. John's, are currently active STELLAR Schools and their Web sites can be accessed through the STELLAR Schools homepage. The use of the

network connection by both teachers and students can be seen from the content that is appearing daily at these sites. Several additional schools will be brought on-line during the remainder of this school year. When fully implemented, this initiative will provide connectivity and support for nearly one-third of the province's schools.

Projects to date range from the development of a database of individual training plans for a cooperative education program which will include video clips of job placements to a research project on genealogy which encompasses networking for both research and publication. Another project is the development of a Web site devoted to highlighting the history surrounding war monuments in Canada and yet another is the use of the network connection to allow students to collect information and maintain communications with other students on environmental topics of global concern. Several schools are participating in Project Rivers, which is a flagship project of STELLAR Schools.

Project Rivers is a combined effort of the Stellar Schools Initiative of STEM~Net and Cable Atlantic along with other partners such as the Friends and Lobbyists of the Waterford River and The Quidi Vidi/Rennies River Development Foundation in St. John's. It brings together the resources of all these groups to provide the basis for classroom projects using the latest in communications technology to help classes appreciate and preserve local watersheds. Hopefully, it will expand to benefit many more classes and many more rivers across Newfoundland and Labrador, and across the rest of Canada.

Project Rivers involves a variety of project structures and a variety of grade levels. The common thread



Students from Holy Heart of Mary High School analyze water samples taken from their section of the Rennies Mill River in St. John's

among all participating classes is the adoption of a section of a waterway close to the school. Participating classes will then collect scientific data from their section of river to contribute to a database of on-line information on watershed areas. In addition, each class will focus on other issues pertinent to their section of river that involve environmental problems such as pollution, urbanization, or re-routing of waterways. Other projects will cover historical studies of watershed areas; art, literature and poetry inspired by the rivers; archaeological finds near the rivers; and political and social aspects of the role of the river or body of water within a community. (See <http://www.stemnet.nf.ca/Projects/Stellar/stelriv.html>)

Guidelines for schools which are developing STELLAR Schools project proposals can be found on the Web site. These guidelines are intended to assist in the development of projects which make the best possible use of the technology as an integral part of the curriculum across all subject areas and at all grade levels in the STELLAR Schools. As projects

are developed at the schools, examples of specific projects will be added to the site. These can then be used as guidelines or as sources of ideas by other schools who are developing networking projects, whether or not they are involved in the STELLAR Schools initiative. Ω

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Open Learning and Health Care

practitioners in the health care sector are using distance education and multimedia to upgrade their skills



Keeping up with changes in medicine and health care practices is a challenge for individuals who work in the health care industry. Three projects at Cabot College, St. Clare's Mercy Hospital School of Nursing and Memorial University's Faculty of Medicine are using new techniques to help practitioners meet this challenge and provide them with effective and efficient methods to upgrade their skills.

NURSING ASSISTANT REFRESHER COURSE

Nursing assistants who have been out of the field now have a new option to help them re-enter the profession. In September 1995, Cabot College piloted a nursing assistant re-entry course through distance delivery. Thirteen students across the province enrolled in the course.

For over 10 years, Cabot College has offered a full-time Nursing Assistant Re-entry program through its School of Health Sciences, located at Cabot's Topsail Road campus in St. John's. This course is a requirement for those who have completed the

training necessary for registration as nursing assistants in the past, but do not currently meet the registration requirements of the Council for Nursing Assistants. The traditional course is delivered over an eight-week period, with the time split between academic and clinical components. The distance format is 12 weeks of theory in addition to a four-week clinical placement. Once they have completed the distance education course, nursing assistants who have been out of the field are qualified for registration with the Council and can work as registered nursing assistants.

Cabot College has the responsibility for training nursing assistants in this province and has significant expertise and experience in this field. However, for several years potential students who reside outside the St. John's area have been actively campaigning to have the course delivered using distance technology. While the course offered in St. John's has been well attended, both the Council of Nursing Assistants and Cabot College recognized that distance delivery would be a viable alternative to the

traditional on-site delivery, especially given the College's experience and expertise in distance education.

Through distance delivery, Cabot College is meeting the challenge of providing cost-effective training to specialized groups throughout the province and enabling a wider range of students to re-enter the workforce in their chosen fields.

Christine Molloy, Coordinator of Distance Education at Cabot College, reports that the pilot course has recently been evaluated and plans are underway to offer the course again in May 1996. The College's commitment to work with existing course materials and within the established distance education infrastructure of the province ensures that courses will be cost-effective and will avoid unnecessary duplication.

NURSING EDUCATION

For more than ten years the staff of the Learning Resources Centre of the St. Clare's Mercy Hospital School of Nursing in St. John's has been producing resource materials for its nursing students and faculty members. A

number of audio-visual and computer-aided instruction programs have been developed at the school. For example, a Windows version of a computer training program, "Dosages and Solutions", has been developed in FoxPro and consists of a review/test-ing package with a sophisticated scor-ing component. This program has been sold to several nursing schools across Canada. Other recent examples of St. Clare's production projects include the development of an APA Wizard, a computer program which students use to convert their assignments into APA format.

The most recent production project completed at the school is a multimedia interactive computer-assisted program for instruction which bene-fits students who are studying the res-piratory system. It includes computer-ized graphics, breath sounds, and immediate on-screen feedback.

This project encouraged staff at the school to develop a plan for a computerized video editing system which could be used to produce a variety of interactive multimedia instructional programs. After thor-ough research, the staff of the resource centre chose the Apple Power Macintosh platform and a combination of Micromotion and Adobe video editing software. The computerized video editing equip-ment will be used to produce learning materials which will be comparable to the best productions of any nursing school in Canada. In addition, the use of the equipment will encourage cooperative production projects between the school and other groups, such as the Open Learning and Information Network.

With this new equipment, the staff of the Learning Resources Centre will be able to produce educational multimedia instructional mate-rials in formats which include videos, interactive CD-ROM, and Internet

applications. By expanding the school's technical capabilities and resources, the staff will continue to produce health-related educational resources for Newfoundland and Labrador and the rest of Canada. The new equipment and knowledge will provide materials for Continuing Nursing Education and Distance pro-grams, areas of nursing education which are currently expanding.

APPLICATIONS IN HEALTH PROFESSIONAL EDUCATION

The Faculty of Medicine of Memorial University through its Office of Continuing Medical Education is responsible for the administration and delivery of courses in continuing medical education to the general family physicians throughout Newfoundland and Labrador. These courses are essential to physicians who wish to upgrade and become current in various areas of medicine. A recent project institut-ed by the Multimedia Centre of the Faculty of Medicine is providing an alternative method of delivery for these courses by utilizing a computer-based learning format.

The project has two related compon-ents. The first component is a CD-ROM based course in dermatol-ogy which will be used to assess the viability and acceptance of this method of course delivery. Dermatology was selected because of the interest of Dr. Wayne Gulliver, one of four qualified dermatologists in the province and Assistant Director and Clinical Liaison of the Multimedia Centre. A Rural Family Physician Research Network and the Family Practice Unit in the Faculty of Medicine have a crucial role in this project. Physicians are recruited from ten clinical sites throughout the province to participate in and evalu-ate the method of delivery.

An immediate benefit is the

reduction of costs in the delivery of courses. In addition, participants receive a copy of the entire course including audio-visual filmclips of clinical office procedure demonstra-tions which they can use for future reference.

The second component of the project is the development of an elec-tronic course syllabus using CD-ROM technology. It is used for an under-graduate microbiology course in the Pharmacy program. The electronic syllabus is an effective reference and study guide which includes course outlines, reference lists, colour slides, lab demonstration material and other materials to be distributed to thirty students in the course. It also helps to familiarize students with the technol-ogy and its potential applications. A second phase of this project is the development of multimedia presenta-tion packages in Microbiology for the course instructors to use during formal presentations. Modules in a multime-dia format can be prepared to improve lectures by the faculty mem-bers.

In addition to promoting the innovative work of the Multimedia Centre, the project helps both stu-dents and faculty members under-stand and appreciate the applications of educational technology in their teaching and learning. Future phar-macists and physicians will be encour-aged to utilize computer technology in their studies and work environ-ment and to support the continued development of the Multimedia Centre. Ω

NURSING ASSISTANT REFRESHER COURSE

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APPLICATIONS IN HEALTH PROFESSIONAL EDUCATION

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Project Profile

The Internet Satellite Project

STEM~Net is the major link that Newfoundland and Labrador educators use to communicate with each other and their colleagues in other parts of the world. It provides them with valuable Internet access and, through the RINGS project, allows students to participate in innovative on-line projects. More and more of these users are taking advantage of the World-Wide-Web and graphics-based communications. As the network grows in this direction, so does its communications requirements. However, the majority of the telephone exchanges in the province are based on older technologies and do not provide data transfer rates that allow reasonable access to these new resources.

In the province's larger centres, Cable Atlantic or Newfoundland Telephone provides very high speed connectivity at quite affordable rates. In 19 local-dial areas outside of St. John's, NLnet or Newfoundland Telephone provides medium speed access. These two types of regions represent approximately 50% of the province's schools, 30% of teachers and 70% of students. In other regions CanCom or other satellite providers offers medium speed access to individ-

uals but do not yet support school local area network (LAN) access. This service, however, could support 20% of the province's schools when LAN support is available.

The remaining schools are in regions too remote or situated in communities with populations too small to support either of these solutions. The Internet Satellite Project hopes to remedy this situation. Two-hundred and ten schools will be provided with a satellite dish that receives an Internet signal from one of Canada's Anik telecommunications satellites. A special card and software will be installed into a computer dedicated to processing this signal. If the computer is connected to the school LAN, each computer in the network will be able to access the Internet. Telephone lines provide the link for out-bound traffic and must be connected to an Internet service provider such as STEM~Net. Since out-bound information is generally text-based, the slower telephone links will be able to deal adequately with the significantly reduced traffic. This project is scheduled to begin in early April 1996. Ω

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Prototype Modules for Open Learning in Mathematics and Science

a researcher explores courseware possibilities with innovative authoring software

Integrating technology into the classroom will depend largely on the availability of high quality, affordable software. "Courseware" has to be relevant, interactive, easy to use, visually attractive and appropriate for its intended audience. The software has to motivate students, and encourage them to explore and experiment with the concepts that are being presented. A model for courseware development has become the focus of a project that will produce courseware for use in Mathematics and Science.

Software development has been traditionally an expensive and time consuming process. Companies that produce educational software make products that are aimed at as large a market as possible in order to gain the greatest possible return for their investment. In many instances, software is designed to meet the needs of a specific program in a specific region. The software is then offered to educators in other areas in the hopes that it will be close enough to their needs to

prompt a sale. The products are rarely tailored to meet the needs of each buyer. The participants in this project hope to develop a fast and cost-effective approach to courseware development. These improved methods of production will allow greater flexibility in the software and provided educators with products that are tailored to their needs.

The main component of this new process is the Operations Modelling and Analysis Core (OMAC). OMAC was developed by Kenneth McKay, David Kletter, and Stephen Graves at the Massachusetts Institute of Technology. McKay is currently a member of Memorial University's Faculty of Business Administration.

OMAC is authoring software designed to greatly accelerate the production of courseware that will be used for the exploratory and interactive teaching of scientific and mathematical concepts. This tool has been shown to require significantly less time and effort than other authoring approaches. Because of OMAC's flex-

ability, changes to the courseware also require less effort. OMAC has special constructs, libraries and features designed to represent mathematical and scientific concepts. These special features provide a tool kit with which to work and construct the content of the courseware packages. The tools allow mathematical concepts to be presented using several styles and approaches including animation, simulation, multimedia, graphs, and charts. Teachers can use the courseware built with OMAC to easily guide a student through various concepts.

The applications produced by OMAC can be teaching modules for use by teachers or students to explore concepts, or canned turnkey applications used by a client. The application creator works with two major components. The first is a collection of objects with attributes, such as menus, windows, graphics and text. These are manipulated using an object editor. No programming is needed; rather the author uses pre-

specified OMAC templates. The second component consists of event handlers programmed in Pascal or C. The author makes use of OMAC subroutine libraries for animation, notes, simulation, mathematics, graphs and other elements. It is also possible to call on other libraries or applications. A simple application with three input fields and three graphed functions can be made up of several objects and approximately twenty lines of code. An application of this type may take less than an hour to create.

OMAC is an open system. It is possible to extend OMAC by adding new objects and libraries. The applications created using OMAC currently run on Macintosh computers. The authoring software is proprietary and also runs on a Macintosh platform.

OMAC also supports a database concept. When an application is running, it is possible to store the current collection of objects to disk and later reload the collection. As with most features in OMAC, this function can be enabled or disabled depending on the application.

Six demonstration modules for grades 6 to 12 have already been prepared by McKay. The topics of these modules include Newton's Second Law, the bending of light, parallel and serial circuits, projectiles, maximum area calculations, and acceleration. "It's important that students be able to interact with the courseware and through this interaction, experiment with or explore the scientific concepts," says McKay.

In the acceleration module, for example, the students control a simulation of two trucks accelerating. By controlling variables such as force and friction, students can see how these variables influence the movement of the trucks. As the students change the variables, they are actually controlling the speed of the animated trucks which represents the influences

of the various forces. In the module dealing with the bending of light, students are shown how light refracts as it moves from one medium to another. The animation shows how a bird would see a fish. Graphics representing light show how light would refract as it enters the water, reflects off the fish, refracts again as it leaves the water and is perceived by the bird.

The modules break down each topic into its components and allow the students to see how each component is related to others. The modules allow for the use of calculators, demonstrations, animations, computer-aided tutors and computerized quizzes and tests. The modules provide open access to the teacher in the classroom to structure a problem's characteristics and deal with responses. The student versions of the modules are designed to provide a guided path for students in a self-directed format.

Beginning in 1996, a series of prototype and demonstration modules in mathematics and science for grades six through twelve will be developed with funding supplied by the COOPERATION Agreement on Human Resource Development. Twelve modules will be created, each with a student and teacher version. These will be made available to teachers throughout the province using a non-profit model of distribution.

Erin Keough of the Open Learning and Information Network (OLIN) is assisting with the instructional design and assessment of the modules. Charles Harkins, Principal at the Newfoundland School for the Deaf, is also assisting in module review and providing access to the necessary technology for both students and teachers. As Phase I of the project proceeds, the completed modules will be supplied to the students in the multimedia program of the Stephenville Campus of Westviking

College for possible refinement and analysis as teaching aids.

McKay has been using courseware developed with OMAC in his operations management course in business since January 1994. Some of the modules he has designed for his course are also being used at Stanford University, Sloan School of Management (MIT), Harvard School of Business and the London School of Business. Ω

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Council on Higher Education
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Multimedia Teaching Strategies for the Open Classroom

As the number of learning resources to enhance the K to 12 curriculum increases each year, practising teachers are challenged to access effectively what they need for their classrooms. Incorporating computer-based multimedia technology into the school setting is the focus of a two-year project currently underway in St. John's. The project brings together Memorial University's Department of Computer Science and Bishop's College, a local high school. The goal is to develop a single, user-friendly multimedia interface and support materials which will be accessible to all teachers regardless of their curriculum area or technical skill level.

Multimedia computer systems combine sound, image and text in an interactive style to provide more effective communication. To truly utilize multimedia, teachers need the flexibility to arrange, modify and incorporate selected components of multimedia materials and technology into their instruction.

Current multimedia materials pre-

sent problems of accessibility and design. Remote locations present access difficulties in the education system of Newfoundland and Labrador. Funding for upgrading is usually insufficient. The result is a reliance on machines of older design, which often makes the use of latest software or equipment impractical. Without guidance in adopting multimedia materials in the classroom, many teachers are unlikely to have the time to learn technical skills and prepare the necessary materials. Typically, they have to develop successful strategies for incorporating multimedia into their classroom environment, at the same time that they are discovering the capability of the technology.

The design of existing multimedia material also causes problems. While teachers want to use the multimedia package most effectively in instruction, this is not always possible. Most multimedia material is pre-packaged as a complete presentation and cannot be modified by instructors to meet the needs of their students. In

addition, software requires specific technical skills that must be learned before the multimedia package is used. The software may restrict how the multimedia material is used.

This multimedia project has five components. It began with researching and identifying the most successful and beneficial strategies for integrating multimedia tools into the classroom. The proponents have developed a guidebook for teachers in the uses of multimedia. "Multimedia in the Classroom", contains teaching strategies, teaching aids, multimedia examples, and technical information. As a practical guide, it offers alternatives to conventional classroom materials by using multimedia resources in several ways. For example,

- as a source text to enhance textbooks, providing tutorial sessions, self-testing, review and remediation
- as a source for independent and group activity, replacing some of the conventional written essays and assignments. Students, for example, can work on their own multimedia productions.
- for multimedia demonstrations to enhance lectures by using visual and sound images
- for multimedia experiments in science

The guidebook will also provide prescriptive suggestions to help teachers choose the appropriate use, based on the objectives of the lesson and the needs of their students. It offers a step by step guide to multimedia strategies and identifies the resource requirements for each strategy, including the hardware and software needed, technical information on how to use them, the time required to use the resource and the skills required of teachers and students. Examples of the use of multimedia provide a general model for the teacher.

The third component of the project is the development of a single, unified multimedia platform which enables technical information and multimedia materials to be shared among all users on both IBM and Apple applications. The integrated multimedia platform is a software program or set of programs which provides a common system for all multimedia users. This was a challenge given the variety of multimedia products used in schools throughout the province. Current programs needed to be evaluated and new software designed. Once the new multimedia platform is developed, teacher in-service will begin.

Teacher training materials and pilot projects have been developed to explore the possibilities of on-site, remote, and self-instructional training sessions. Training materials include instructor-conducted sessions, multimedia instructional unit and a training institute. Finally, by the fall of 1996, a bank of multimedia materials will be available on a wide area network.

A central depository of multimedia materials will be available to the school community and will be comprised of several types of material, including raw sound, image and data files, collection of finished productions, information on other sources of multimedia material, a database system to assist in selecting material, and a collection of suggestions on using multimedia materials. Information on the use of the depository is included in the guidebook as part of the multimedia teaching strategies.

The practical outcomes of this project over a two-year period will be to develop multimedia teaching strategies, create and evaluate multimedia resources, and provide teacher training in multimedia use. The products will simplify access to the wealth of resources available in multimedia

format, and will encourage both teachers and students to make more frequent and productive use of those resources in the classroom. The computer skills which will be developed under the training component are essential in the modern electronic workplace. The final products will be adaptable by teachers to suit their teaching environment and methods and the technology available to them. It is hoped that the techniques pioneered by this project can be adapted to allow for the delivery of courses through distance education using multimedia tools. Courses, once developed, can then be shared with other schools within the province.

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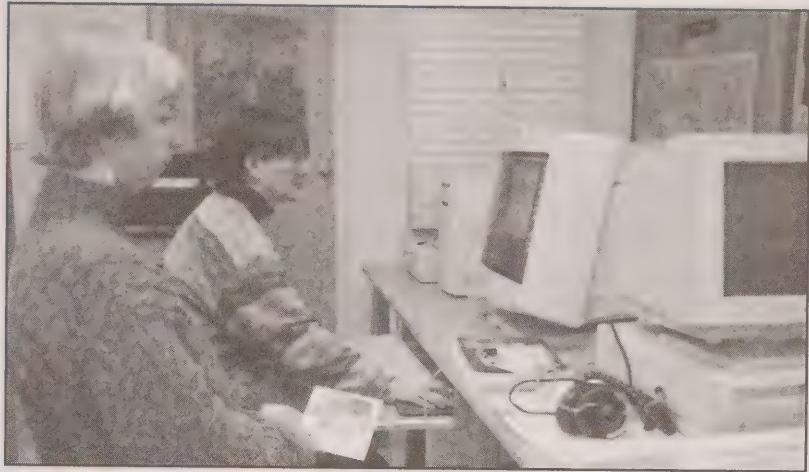
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(RINGS, continued from page 13) images, and allowing students to manipulate them in space (without having to purchase expensive software and equipment). Talented students such as musicians, artists, or athletes, able to benefit from extra help but lacking in resources, can utilize the Internet to conference with teachers, coaches or others who would be able to provide that extra incentive to help them to develop their talent to its full potential. This technology gives students control of an environment that can only help develop their creative abilities and better prepare them for the future. Ω

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Multimedia Language Centre



the Faculty of Arts at Memorial University takes a major step in language lab technology

Technology has played an important role in language instruction for some time. Audio language labs have been used to help students learn the nuances of foreign languages for decades. The technology of foreign language instruction, however, is changing and Memorial University has taken a major step forward in this area with the new Multimedia Language Centre (MLC). The Faculty of Arts has refurbished the audio language lab in room 4022 of the Science Building with 41 Macintosh computers. A Power Macintosh file server makes courseware available to students on 30 work stations in the student section of the centre. The ten remaining computers are used primarily for courseware development.

Karin Thomeier, director of Memorial University's language laboratories, has been working on this project since September 1994 and is pleased that the work resulted in the development of this state-of-the-art facility. "It came time to replace the old audio lab," says Thomeier. "To replace the lab with another audio

only facility would not have been a step forward. The committee set up to study the project, the Dean of Arts (Terrence Murphy), and the university were open to the idea of a lab that used a multimedia approach."

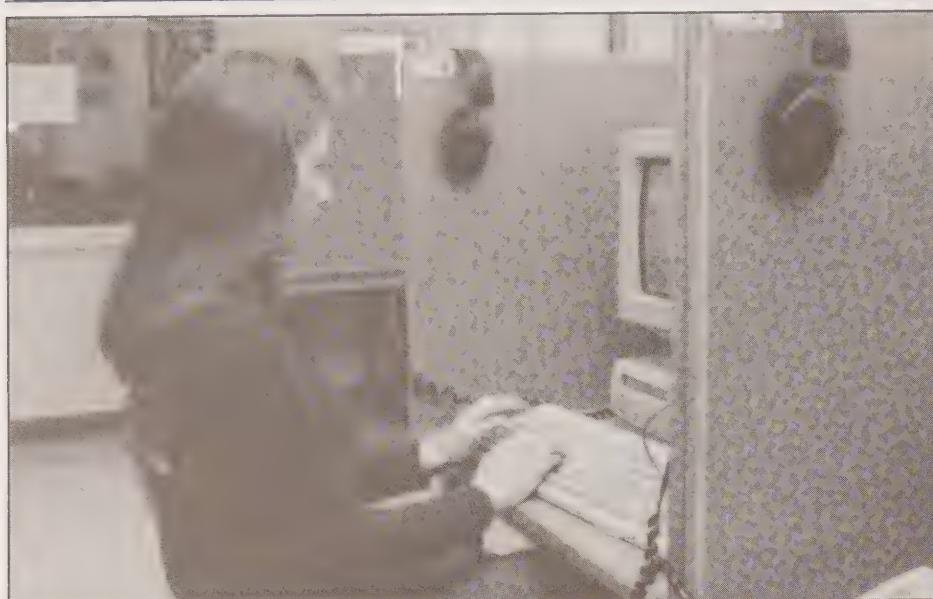
The facility has been in operation since October 1995 and officially opened on March 8, 1996. The centre receives a great deal of use by students individually and the staff also intends to offer the lab for use on a class basis. Currently, the MLC has software that supports the first year courses in French, German, Spanish and Classics and French 3501.

The staff of the centre uses very little commercially prepared courseware and prefers to create their own using authoring packages. The technical aspects and software development for the MLC are overseen by Jennifer Bates. "We can provide the technical expertise but faculty members have to provide the knowledge base for the instructional material," says Bates. To encourage software development the Multimedia Language Learning Centre Committee has chosen *Authorware Professional*, an intuitive

and user friendly Macintosh-based authoring package.

The authoring software uses icons to represent the different functions that professors may want to incorporate into their courseware. They can add a graphic, create options for work flow, give students the option of repeating an exercise, or add video or audio simply by dragging and dropping an icon into the storyboard that graphically represents the flow of their software. Bates is offering seminars to help professors become familiar with the authoring software. The in-service is conducted in eight weekly sessions. "The first session is a demonstration to give the faculty an introduction to the software and give them an ideal of the possibilities," says Bates. "The rest of the sessions are very much hands on. By the end of the eighth week they will have produced tutorial courseware for their own courses." The MLC hopes to offer these sessions to all Memorial University faculty, high school teachers and faculty from other universities within the next year.

The impact of the new facility on



Project Profile

Web-Based Open Learning Pilot Project

Krista Simon takes advantage of tutorial courseware at the MLC to get some extra practice with French grammar for French 1051

the students has been very positive. Krista Simon, a first year student taking French 1051, has been making good use of the MLC since it opened. "I really appreciate the opportunity to get extra practice and drill. It's been a great help," remarks Simon. "The instant feedback is wonderful." The software at the centre gives students an opportunity to get extra practice with the vocabulary, grammar and comprehension of a number of foreign languages. They can choose from several different types of exercises. The software corrects their work instantly, points out their mistakes and gives them a chance to make another attempt.

They can also listen to a passage in a foreign language and practise writing what they hear. If they make errors, they can make corrections, repeat the exercise or move to a new one and practise the skills from a new perspective. Some of the commercial software allows students to practise their verbal skills. They can listen to a passage being read, record themselves reading the passage and then compare their pronunciation. The lab is also the first facility to use new net-

working software from Apple that simplifies the process of student monitoring.

Bates and Thomeier are confident that the use of the MLC will continue to grow. Soon, they hope to expand the services they offer in the centre to include foreign language word processing. The centre has potential to service other disciplines in the Faculty of Arts and these possibilities are also being considered. Ω

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The Open Learning and Information Network, under the auspices of the Council on Higher Education, has been given the go ahead to pilot new strategies for the development of courses for delivery via "new media." Two college-level courses, Organizational Behaviour 1310 and 2310, and the university course Organizational Behaviour 2301 will be the first courses revamped using these strategies.

The college courses, in their current open learning format at Central College, are open-ended, modular and each takes three to four months to complete. There are no lectures. Printed resource materials are the primary delivery mechanism. Teleconferences could be held at central sites, and support provided by a 1-800 number and by visits to the centre. The new element that will be added to these courses will be the use of the World-Wide-Web (WWW) to assist delivery. Using the WWW will centralize the location of administrative information such as course outlines, registration information, handouts, assignments and notes. The Web site (*continued on PILOT on page 31*)

Project Profile

Technology Education Teacher Preparation for the 21st Century

a new state-of-the-art technology facility is established in the Faculty of Education at Memorial University

by
Dennis B. Sharpe

Phase one of the development of a model facility for technology and science teacher preparation at Memorial University is due to be completed this spring with initial use during the 1996 summer session program. Located on the third floor of the G. A. Hickman (Education) Building, the new laboratory facility has been designed primarily, but not exclusively, for pre- and in-service teacher preparation in technology education. Features, equipment and layout of the laboratory have also been organized to accommodate selected science teacher education courses and activities. Other potential uses include the preparation of teachers in many disciplines in the use of communications technology to enhance the delivery of many other curriculum areas found in the school system. Further, it is anticipated that the facility will serve as a professional development location for teacher in-service. The second phase of development, which includes model science laboratory facilities, is in the planning stage.

WHY TECHNOLOGY EDUCATION?

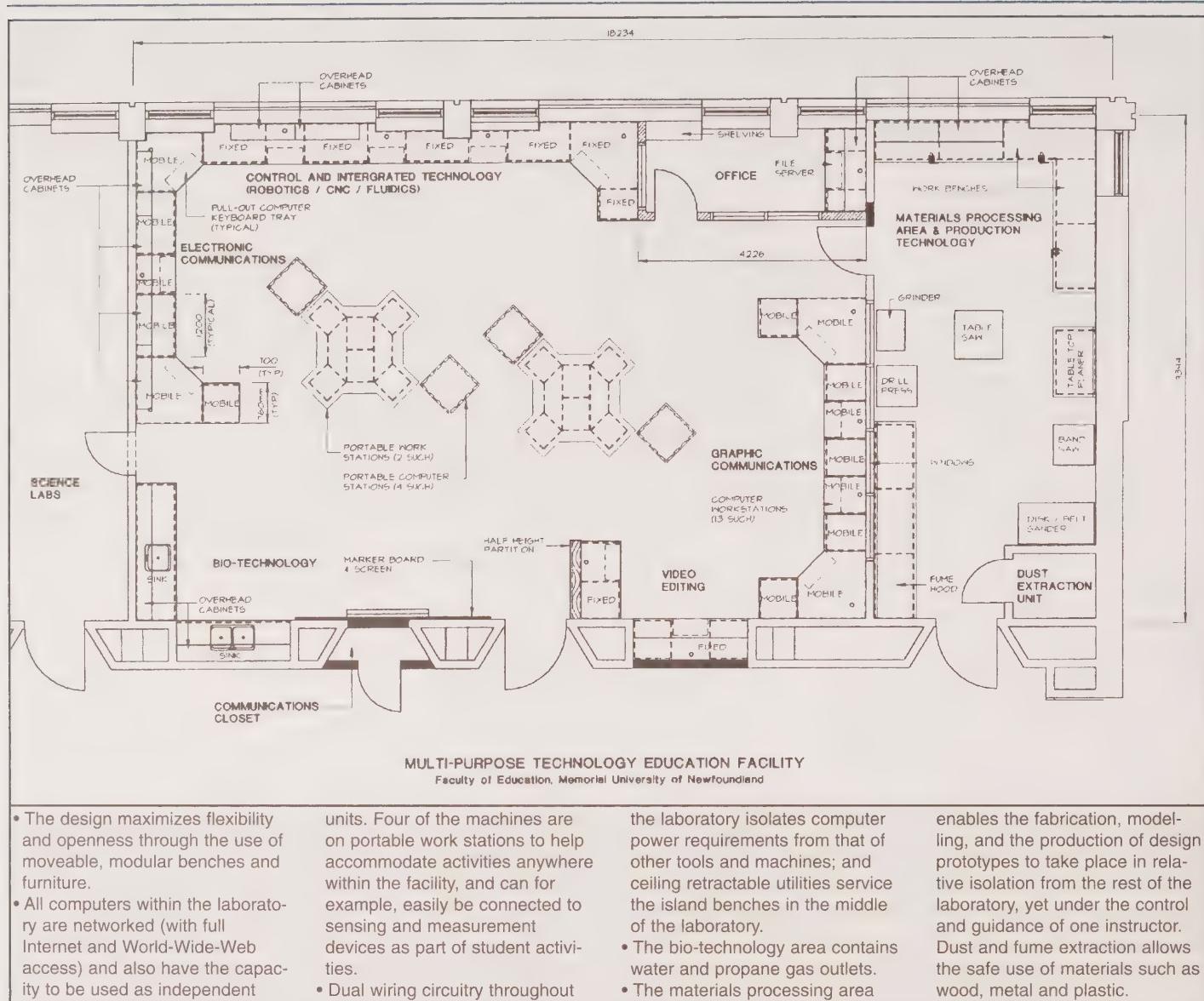
The importance of science and

technology is clearly enunciated in numerous recent federal and provincial documents that address the future needs of society and the development of a competitive, well-educated workforce and vibrant economy. The document, *Change and Challenge: a Strategic Plan for Newfoundland and Labrador*, (1992) cites, as part of an action plan, that the province will "introduce new programs at the intermediate and secondary levels which focus on the sciences, enterprise, cooperative education and technology based education" (p.13). Intentions to expand computer and information based technologies within the school system were similarly expressed. A more recent document from the provincial government, *Adjusting the Course Part II* (1994), further emphasizes the need to improve science and technology education and clearly indicates that both be part of the core curriculum for all students. This sentiment is echoed in the Government of Newfoundland and Labrador (1995) senior high school program curriculum reform document, *Directions for Change*, which recommends that all students acquire credits in technology education as part of graduation

requirements. At the federal level, the National Prosperity Secretariat in its documents, *Building a Foundation for Prosperity* (1992), and *Inventing our Future, the Prosperity Action Plan* (1993), strongly indicate that priority within the education system should be given to establishing "Technology Foundation" courses, increasing the understanding of technology, and developing technological literacy.

The emergence of technology education as a discipline has also resulted in it receiving similar prominence and attention across North America and Europe and in other countries. In the United Kingdom students are required to study "Design Technology" and "Information Technology" courses in their first 11 years of schooling.

Closer to home, the "Essential Graduation Learnings", developed by the Atlantic Provinces Education Foundation specifically identify "Technological Competence" and "Problem Solving" as two of the seven major outcomes of schooling. These are key elements of a technology education program. Technology education can also contribute, as can other disciplines, to the rest of the



- The design maximizes flexibility and openness through the use of moveable, modular benches and furniture.
- All computers within the laboratory are networked (with full Internet and World-Wide-Web access) and also have the capacity to be used as independent

units. Four of the machines are on portable work stations to help accommodate activities anywhere within the facility, and can for example, easily be connected to sensing and measurement devices as part of student activities.

- Dual wiring circuitry throughout

the laboratory isolates computer power requirements from that of other tools and machines; and ceiling retractable utilities service the island benches in the middle of the laboratory.

- The bio-technology area contains water and propane gas outlets.
- The materials processing area

enables the fabrication, modeling, and the production of design prototypes to take place in relative isolation from the rest of the laboratory, yet under the control and guidance of one instructor. Dust and fume extraction allows the safe use of materials such as wood, metal and plastic.

graduation outcomes identified by this interprovincial group.

THE NEED FOR GOOD FACILITIES

The pervasive influence of technology is especially apparent in the workplace, in schools and in many other aspects of our daily living: it permeates all facets of our lives. Both technology education and science are key elements of the school curriculum that require well-prepared teachers versed in current methodologies and content. Quality facilities and programs are needed. The facilities can be used for initial teacher preparation as

well as for continuous upgrading and in-service as part of a renewal process for the profession that has direct implications and consequences for student learning.

Recent changes and developments in science education, where revised content and suggested delivery strategies be technology based, and the emergence of technology education from what was industrial arts education, have highlighted the need for appropriate facilities that reflect state of the art equipment and delivery techniques for both disciplines. This is especially important at a time when new technology edu-

cation courses are being developed and piloted for the schools of Newfoundland and Labrador as part of the overall introduction of a proposed K to 12 technology curriculum framework as outlined in the Department of Education document, *Technology Education: Living in a Technological Society* (1994). It is also appropriate for pre-service teachers as well as the current industrial arts teachers (and others) that require retraining and upgrading to be accommodated in facilities that properly reflect appropriate technologies and that can be used to demonstrate how technological processes and

products can be delivered in an educational setting.

The Newfoundland and Labrador technology education curriculum framework, based on a K to 12 progression of experiences, includes the conceptual organizers (technological domains) of communications, control, production, energy and power, and bio-technology. Cutting through each of these are outcomes related to the nature of technology, technological problem solving, technological impact, technological literacy, lifelong learning, and technological communications. School curriculum content and courses in technology education are based on this framework and are intended to be delivered through practical hands-on experiences.

The proposed facility will not only enable technology education and science teacher education preparation, but also facilitate the strong links that already exist between the two disciplines and efficiently deal with overlapping needs in terms of equipment and other resources. It will help promote links between science education and technology education curricula, and demonstrate how in the school situation, the complementary as well as the unique nature of each discipline could be developed for the benefit of all students.

THE TECHNOLOGY EDUCATION LABORATORY

The facility is a two-part, multi-purpose laboratory of about 171 sq.m. It consists of two adjoining rooms designed to provide a separate materials processing production area while maintaining full visibility across the whole facility and easy access from one part to the other. The larger portion of the laboratory contains equipment and resources that will allow teacher preparation in technological areas of control and integrated technology (robotics, fluidics and CNC

operation), electronic and graphic communications, bio-technology, and materials processing and production technology, as well as selected science and other activities.

DEVELOPING TEACHER COMPETENCIES

The technology education laboratory currently under construction will facilitate the delivery of courses that will enable current and potential teachers to:

- Develop a thorough working knowledge of design and problem solving processes applicable to a wide range of technologies and student ability levels.
- Work safely with a wide variety of materials and processes using hand and machine tools that enable the construction of design prototypes and setting up manufacturing processes and production techniques.
- Set up and effectively manage a technology education laboratory environment organized around the concept of multiple-activity teaching that meets provincial curriculum requirements.
- Develop competencies in computer operations, electronic communications, networking, graphic communications, integrated systems and processes, and power and energy technologies including fluidics.
- Program and operate CNC machines, robotics, and other devices and integrate them to create manufacturing and production operations.
- Develop a thorough working knowledge of the several curriculum constructs and provincial courses in technology education applicable from K to 12 and how to deliver them through practical "hands-on" activities in a multiple-activity setting.

- Develop basic competencies in experimenting, trouble-shooting, and assembling.
- Develop an awareness of the impact and consequences of technology on society, including the workplace and the environment.
- Evaluate student progress and achievement in technological activities and courses.
- Develop an understanding of technology integration and applications across the school curriculum.

The escalating importance and persuasiveness of technology and its use by society have contributed to current developments in technology education and its emergence as a core part of the school curriculum. The new model laboratory facility will enable the teacher education program at Memorial University to respond with high quality pre- and in-service teacher preparation courses and activities relevant to program delivery in the schools. Ω

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Technology Trade Show in Clarenville Demonstrates Open Learning Models

The Clarenville area held its first Technology Trade show in February 1996. "Techno Interact '96", was presented by S. Feltham Associates and the Clarenville Telematics Strategy with funding from the Canada/Newfoundland COOPERATION Agreement on Human Resource Development. The trade show combined an exhibition of information technology and a two-day workshop and mini-conference. The exhibition was held in the Clarenville Winter Games Complex and included displays by organizations such as computer and software suppliers, educational institutions, financial institutions, multimedia developers, petrochemical industries, engineering technology firms and Internet service providers. Emad Rizkalla, Vice President of Zedd Technologies, was the keynote speaker. In his presentation, he identified some of the difficulties encountered when establishing a technology-based industry in Newfoundland and Labrador.

An Open House on "Information and the Internet" was organized by

the Enterprise Network at the Clarenville Telecentre at Eastern College. On the first evening of the conference, Jack Botsford, Executive Director, Newfoundland and Labrador Alliance of Technical Industries, gave a presentation on the training needs of the information technology industry. The Alliance has 115 members, including approximately 80 private sector companies. Botsford explained that the information technology sector of the economy is growing at an enormous rate and represents substantial employment opportunities in this province and across Canada. While there is a "healthy knowledge-based sector in Newfoundland and Labrador already," Botsford points out, "in terms of human resource development, this industry is lacking a sufficient labour force." Growth is constrained by the inability to find adequately trained people. The industry is looking for three key qualities in its employees: attitude, aptitude and flexibility. Individuals need to be trained to solve problems.

On Saturday, Wilf Bussey, Director of Computing and

Communications at Memorial University, spoke on the growth and functions of the NLnet and its competitors. The NLnet provides Internet access and value-added services to the education and research community of Newfoundland and Labrador.

Other sessions included discussions on various issues pertaining to the information technology sector including: an example of Telework by John Fisher of Fisher Associates; a presentation by Glenn Thorne from Software House; an exploration of investment opportunities in information technology by Todd Noseworthy and Craig Bishop from the Community Futures Development Corporation; and training issues by Keyin Technical College, presented by Mike Walsh.

On Saturday afternoon, Doug Young gave a presentation on the Teleworking program at Eastern College of Applied Arts, Technology and Continuing Education, Clarenville campus.

The college currently enrolls 40 to 50 students full-time in its telelearning program. Telelearning involves teaching and learning through the use of a variety of technologies, such as print, video, telecommunications, and computers, to reach learners at a distance.

The program is particularly valuable to individuals in rural areas who are unable to attend classes at the college because of other commitments. Telelearning includes adult basic education courses, a graduate self-employment program, small business home study and teleworking (1 and 2 year programs). The college has adopted the self-directed learning model in which students are encouraged to learn without competition, gaining competency at their own speed. Learning guides accompany each module of the program. They guide the student through the objec-

tives and explain precisely the items to be practised and applied in assignments to be submitted for evaluation.

Young is the Department Head of Telematics Applications and an instructor in the teleworking program. Teleworking involves training people to work out of their homes through distance technology. The College offers a two-year program for people with little or no background in the field of information technology and distance education. A one-year program is given to those with some skills, training or post-secondary education. Each student interacts with the college by telephone, email or the World-Wide-Web (WWW). Young emphasized in his presentation that "learning is self-directed and work is based on performance not presence."

The Teleworking program is spread over four semesters with a wide variety of electives. Courses include Introduction to DOS, Electronic Spreadsheets, Wordprocessing, the Information Industry, Accounting, Entrepreneurial Studies, and Communications. Students complete two Teleworking Modules which include courses on Self-Management Skills, Project/Team Working, Legal/Regulatory Framework of Teleworking, Advanced Communications Skills for Teleworking, and Training and Updating for Teleworking. The objective of the teleworking program is to produce graduates who are able to "function effectively as employed and self-employed teleworkers with sound backgrounds in computer technology and information technology or business."

Instructors Doug Young and Judy Greene maintain close contact with the students by providing them with a wide range of assistance. Instructional resources are available, such as the "Handbook for Teleworking". A technical support team helps students set

up their computers, connect electronically with the college and install software. Students have access to the college's counselling services which offer them advice and training in study skills, time management skills and stress management. An audio teleconferencing session allows students, instructors and a guest speaker to interact and discuss topics in the course. Students also benefit from access to resources on the Internet. Instructors also take the time to meet with small groups of students in one person's home to deal with start-up problems. These can range from technical problems to how to establish a work environment in the home that is respected by other members of the family.

Many places in this program are funded by Human Resources Development Canada as a training initiative but other students can enrol as well. They begin by coming to the campus for intensive training and introduction to the program and the technology, including the actual assembly of the computer and installation of software. They return to their homes with the computers and all other necessary materials. "Teaching computer applications at a distance is a challenge", says Steve Quinton, principal of the Clarenville campus, Eastern College, "but it offers great potential for job opportunities. Most of the students are women who are trying to balance the responsibilities of work and family all at once."

Graduates will be able to function in remote work environments and should find employment in data retrieval, management, processing, interpretation and presentation of information. Specific work areas include: electronic database searching, information brokerage, records processing or management, database design, database management, homepage design for the WWW,

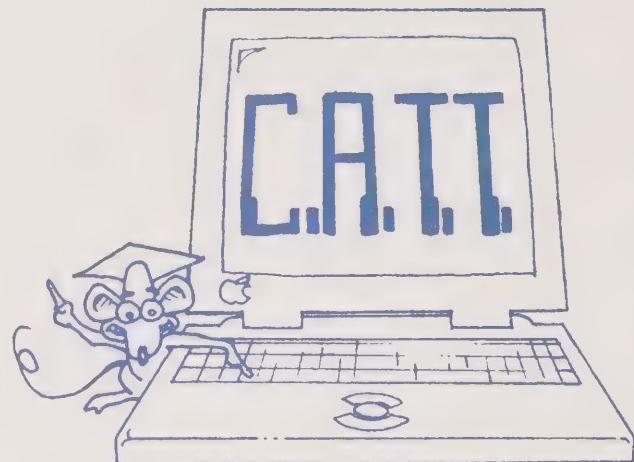
Computerized Accounting, Bookkeeping, and Marketing.

A Centre for Innovative Telematics Applications (CITA) has been set up at the college. The centre looks at innovative applications of information technology to human resource development in rural areas through a broad range of research and development, technology transfer and educational programs. In addition, Eastern College is hoping the Clarenville area will become a test area for linkages to other parts of the world to provide employment opportunities. A Telework Brokerage Service would match teleworkers with employment demands elsewhere. The technology will, in effect, bring employment to the homes of the teleworkers.

Another highlight of the trade show and conference was a presentation given by Roy Cole, principal, and Graham Butler, teacher, at Clarenville Integrated High School. The school has 37 teachers and an enrolment of 600 students in grades 9 to 12. The presentation, entitled "Direction 2000", highlighted the school's rich history, current achievements and challenges for the future. The school benefits from a strong volunteer program and community support. The administration and staff are currently focusing on several ways in which technology can be incorporated into the curriculum. Clarenville High School has been designated a "university school", which is a partnership with Memorial University's Faculty of Education to conduct research on technology and education.

Organizers and participants of Techno Interact '96 are pleased with the success of their initial effort to show residents of the Clarenville area the potential in information technology sector for themselves and their communities. Ω

Computer Assisted Teacher Talk



making good impressions elsewhere in the world

For the past three years, participants in a project entitled "Computer Assisted Teacher Talk" (CATT) have been working to introduce teachers and children in the Exploits Valley Integrated School District to the use of computers as a tool for learning. The program continues to be very successful. In March 1996 Deborah Armstrong, Director of Student Support Services, Ruth Davis, Coordinator of Early Childhood and Primary Education, and Gary Young, Coordinator of Intermediate Education, the designers and facilitators of the project, were invited to share the details of the project at an international conference held in Phoenix, Arizona. The Society for Information Technology and Teacher Education (SITE) promotes the development and dissemination of theoretical and practical knowledge of instructional technologies. This conference offers educators

the opportunity to share ideas, research and experiences with colleagues from North America, Europe, and Asia. The CATT facilitators submitted a paper on the project and were honoured to receive the "best paper award" at the conference.

The proponents believe that one way to encourage students to use computer technology is to ensure they have teachers who are not intimidated by it and who have a commitment to using it as a tool for instruction. In previous years, the school district had committed finances to place computers in all primary, elementary and intermediate classrooms. Unfortunately, in many instances, these computers sat in boxes or were covered with dust protectors in an obscure area of the classroom. Students rarely used the equipment. Professional development sessions had been held for teachers to familiarize them with the technology and to

explore classroom uses. However, such sessions tended to be single, isolated events without the necessary on-going support required to sustain growth and change in classroom practices. The result was that teachers were inadequately prepared to benefit from this new technology. CATT attempts to overcome some of the obstacles to widespread computer use.

A four-year plan was initiated and CATT began in August 1993. From their experiences working with teachers, the facilitators of CATT recognized that if students are to gain the full benefits of computer technology in their learning, then the practical teaching skills of teachers needed to be addressed. There was also an obvious need to forge a link between the use of technology and the enhancement of teachers' professional growth and renewal.

Fundamental to the success of the project was the belief that teachers'

involvement had to be sustained over a sufficient time frame. Teachers had to become familiar with the technology and understand the value of its potential in the classroom. Armed with 25 Macintosh Powerbooks (portable computers) complete with software, the project began.

Teachers within the school district were invited to participate in the project. From a list of applicants, twenty-two were chosen in each of the first three years of the project. Generally, one or two teachers were selected from each school. This means that in every school in the district there are at least six teachers who are able to provide leadership for their colleagues in computer use.

Participants agreed to spend a week during the summer for initial training as well as every Tuesday evening throughout the school year. In return, they were provided with a Macintosh Powerbook 165 for their personal use during the year, an opportunity to share a meal each Tuesday night, conversation and facilitated learning. At the end of the year the Powerbook was exchanged for a desktop computer, complete with software, for exclusive use in their classrooms. In addition, they were provided with a fax/modem, a dedicated phone line and access to the Internet.

The week-long summer session was intended to familiarize participants with the computer and the intended approach to be followed through the course of the year. Many had never turned on a computer and had limited knowledge of computer terminology.

The Tuesday sessions began with a 'check-in' where teachers shared experiences of the previous week. This was followed by 'trouble-shooting' which addressed problems encountered with computer use. This was followed by 'new learning', which examined issues teachers were dealing

with in their classrooms. Teachers were expected to keep a journal and share their entries with the group. A variety of grouping strategies were employed to make group members feel more comfortable.

At the end of the year, CATT participants became facilitators within their schools. One school, sold on the benefits of the project, financed a mini-CATT or Kitten in the school. Computers were purchased and fourteen staff members went through a similar program with the assistance of three board office facilitators and two previous CATT participants.

The result of this project is that computer use as an educational tool is more widespread. Students and teachers are creating learning environments where computers are used to foster the love of learning. The participants continue to share ideas, problems and projects on-line. Follow-up sessions are held each year for all former CATT participants. Ω

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(PILOT, continued from page 24) could also be used to create and make available a list of frequently asked questions. Students can add on-line questions to be answered either by the instructor or other students. To assist with self-study, students can access banks of on-line quizzes or exams which can be automatically marked. They can also use the Web as an on-line resource.

The immediate goal of the project is to produce "new media" learning materials and delivery mechanisms and test their efficiency. For the long-term, this project will establish the parameters for ongoing development of open learning courseware to better serve students in Newfoundland and Labrador and in other educational markets. Ω

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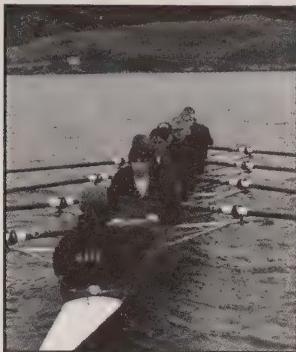
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The cover photograph was obtained with the kind consent of the women's eights crew (Pam Kirkland, Amanda Hall, Kathryn Green, Deborah Russell, Nicolle Hamlyn, Andrea Staple, Leanne Kelland, Susan Windsor and Andrea Rogers) of the St. John's Rowing Club.



Partnerships and Human Resource Development

In the world of team sports, eights rowing is unique. Unlike hockey, soccer, or basketball, when an eights crew is performing they are all doing the same thing and concentrating very hard to make sure they are doing it at exactly the same time. It is a unique partnership that requires each individual to focus on the task and perform in close synchronization with the rest of the crew. Athletes are responsible for their own conditioning and keeping themselves as fit as possible. They encourage one another to perform well as individuals so that they can perform better as a group. The goal is relatively simple, achieved through great effort and determination. When each member of the crew is focused, fit and determined, they will row the course faster than they have ever rowed it before. Regardless of what other crews have achieved, that moment is always special. It is a clear indication that they have bettered themselves as individuals and as a group. Then the cycle begins again, the training, the practising, until the shell is rowed down the course again faster than before.

The partnerships we form to improve our opportunities in human resource development are similar. The achievements of a good partnership are often greater than the sum of the partners' individual talents. Each brings a set of skills to the relationship that is needed to develop a pro-

gram or improve a school, college, university or the workplace. As a group, the focus is to provide the learner with an improved learning experience, or to improve the skills of people so they can perform better and be more efficient in the workforce. The individuals who join the partnership have an opportunity to learn new skills and share the nuances of their own area of expertise. The group benefits from the sharing of ideas and can focus their energy on the task that has brought them together. Once a course has been charted, action taken, and an evaluation of the process completed, the group can continue to work to improve on what they have already accomplished. As the cycle begins again for the rowers, so it continues for individuals involved in partnerships in human resource development because the goals for both groups are dynamic. Like the need to row the course in ever faster times, the partners working on issues in human resource development will need to address the ever-changing needs of the learner, industry and educational institutions.

Partnerships developed in Newfoundland and Labrador have received recognition at the 3rd International Partnership Conference. Six school boards in the Eastern Avalon region of Newfoundland and Labrador were recognized in the NOVA Corporation Global Best Idea

Book for their partnership for preparing youth with the skills they need to live and work in our global economy. A partnership formed to help transform Bishops College in St. John's into a model for technology integration and economic education was recognized in the same publication.

This issue of *Prospects* explores the nature of partnerships in human resource development and examines some of the innovative approaches used to address issues in these areas through the building of partnerships.

Trudi Johnson
Albert Johnson
(editors)

Corrections:
In the Spring 1996 (Volume 3, Number 1) issue in the article "Technology Trade Show in Clarenville..." we incorrectly indicated that the conference received funding from the COOPERATION Agreement on Human Resource Development. We apologize for any difficulty this may have caused.

In the article "The Internet Satellite Project" we omitted two project partners, Newtel Communications/STENTOR and SchoolNet/Industry Canada.

The next issue of *Prospects* will deal with science and technology in human resource development.

DIRECTORY ASSISTANCE

High School Resources on the Web

accessing points of interest
for high school teachers

by
Albert Johnson

The potential of the World-Wide-Web (WWW) as an educational resource becomes apparent as the amount of resource material on the internet continues to grow. For students in high school, using the WWW represents a new approach to learning and encourages them to be more self-directed in their studies. The first three instalments of this column focused on internet resources for primary, elementary and intermediate levels. At the high school level, however, the column will vary slightly from the original format and deal with various subject areas.

The high school science curriculum can be greatly enriched by the resources available on the internet. The STEM~Net homepage is a good place to start. Clicking on curriculum resources will take you to a page of subject links. Clicking on science will

bring up the science curriculum homepage. There are a number of subject areas listed on this page. You can choose from biology, physics, chemistry, and environmental science. There is information on Science Fair projects and links to authors of various science textbooks.

Clicking the biology homepage will lead you to resources for Biology 2201 and 3201. If you move to these sites you will find material to aid in the teaching of these courses. Tests and examinations are available and will be sent to you on request via email. The Biology 3201 homepage is further divided into topics such as ecology, population, genetics and evolution.

Linking to the physics homepage will lead you to resources for Physics 2204 and 3204. Information at these sites is divided into topics such as vector kinematics, electrostatics, mag-

netism, the physics of oceanography, astronomy, nuclear physics and electronics. Tests and examinations, and other resource material are also available. Another link found on the physics page takes you to Bill Beary's Homepage. This page supplies links for amateur scientists on topics such as robotics, astronomy, and science projects and experiments. Science education resources for science and mathematics teachers is a link available on this page. Clicking this text will lead you to a page that contains a large number of links to sites of interest for science educators.

Clicking chemistry on the STEM~Net science homepage will lead you to resources for Chemistry 2202 and 3202, and links to other sites of interest on the WWW. Following these links will take you to several sites such as the NCSA Education Group where you can connect to the Centre for Mathematics and Science Education at the University of Pittsburgh at Johnstown, the Centre for Polymer Studies, and the Centre for the Advancement of Science and Mathematics Education at the University of Natal in South Africa.

The earth science homepage is a very creative web site with links that lead to information on ecology, forestry, recycling and the fishery. Links at this site will take you to the Environment Canada homepage, the Newfoundland Forest Service homepage or to a site containing articles on forestry.

The STEM~Net science homepage also contains links to pages dealing with science fair projects. Dennis (continued WEB on page 24)

Issues and Questions

training provisions on networks



by
George Haché

An ever growing number of educators and trainers, particularly those involved with emerging technology and distance learning, ask increasingly complex questions on the matter of using computers to provide training. These questions deal with the nature of visualization, readability of Net-based content, how information and remote learning services relate to users' learning preferences and various learning settings. Others just question for assurance that perceived requirements imbedded in a Net-based training environment do indeed enhance individuals' performance and skill attainment. For a growing number, the consequences of such provisions are believed to affect individuals' ability to acquire new skills and acquire employment.

Is there sufficient evidence to judge the merit of any particular Net-based training design, methodology, or procedure to designate it as the best? Has the practice of choosing

training designers from the ranks of any one organization led to the production of best programmes? Or, are training providers offering us entertainment and diversion thinly veiled as training? Such questions, although not unfamiliar to training providers, are becoming more prominent with the growth of training offered on the Net and increase in the number of individuals who have acquired the capability of using the medium to extract training content.

As training opportunities on nets become more feasible, the private sector has become an important player, not only in offering training, but in setting benchmarks for an emerging Net-based training industry. A quick scan of training provisions offered on the Net reveals an increasing number of visually appealing documents along with facilitating search capabilities that use hypertext and links to any number of documents. As well, individuals can now retrieve still images, video shorts and sound clips that all

Network specialists, software producers, or individuals who understand the dynamics of software and its disposition on the Net have emerged as gate-keepers in the new training regime.

work to enhance realism and are indicative of a future that promises to expand the availability of training. Distant control of training apparatus, sound and two-way communication are now areas that have been accessed by educators.

Traditionally, training had been provided by colleges, business and industry, usually well-versed in technological skill and know-how and largely focused on skill attainment that matched business and industry requirements. In a number of occupations, training provisions were coupled with additional preparation necessary to earn a licence or professional endorsement to practise in the occupation. With increasing use of Net-based training, fundamental changes are occurring to this traditional training scenario. Network specialists, software producers, or individuals who understand the dynamics of software and its disposition on the Net have emerged as gate-keepers in the new training regime.

If the growth of Net-based training and learning provisions have caught the training industry ill-prepared, it serves to raise questions about training practices and is shaping furtive ground for training improvement. For example, it raises

questions related to how individuals can be awarded credit for learning experiences that they have obtained through the emergent technology. Will the growth of international standards such as ISO-9000 provide some necessary benchmarks that will lead to the improvement of training offerings? How will evidence that can be used to obtain a trade licence or credential be organized, managed, or utilized? The need for evidence of certification for individuals who have achieved a particular level of technological proficiency in any of the multitude of skill-latent occupational fields through Net-based study cannot be overlooked. This becomes complex considering the global nature of the Net.

Other questions may be related to changes to operating policy. Should we anticipate that these new telecommunications-based training provisions will be affiliated to credit-granting institutions through partnership arrangements? In this regard, are prior learning assessment strategies useful in determining the nature and depth of acquired learning, and what can be recognized for various credential requirements? Such questions challenge a number of organizations. Other questions may deal with what

guarantees that material will be systematically upgraded, contain relevant content and is derived from sound development practices. As well, we may want evidence that information is organized for easier access, and that these programs have addressed the uncertainty and risk associated with procuring training using this technology, and that they are a sound educational investment.

The relationship of users to media is an important consideration, and training providers can help users choose which service to acquire without spending too much time in trivial activity or searching for good content.

While there has been a development of interest in quantifiable methods to measure and validate various training practices, there has also been a proliferation of the Net-based training. Evidence of whether Net-based training services reflect findings of cognitive research is arguable and largely unstable because of the nature of the changeable technology that is the instrument of delivery. This leaves questions for the consumer to resolve. For the employer, is the training sufficient? For the trainee, is this of any value and in which context?

There is a need for fundamental research in the effectiveness of knowledge transfer in a Net-based environment. Can a Net-based communication environment transfer knowledge to sufficiently ensure that different occupational requirements and standards for skill levels will be met? Armed with these questions (and a review of Net-based learning provisions) trainers can address their learners' requirements more effectively. Ω

Toward Value Added Education

the partnership institute at
Elwood Regional High
School in Deer Lake

by
Trudi Johnson

sidebar by
Steven Brooks

School viability and community viability are strongly linked in Newfoundland and Labrador today," says Steven Brooks, coordinator of Partnership Education at Elwood Regional High School in Deer Lake. His comment expresses the theme underlying a Partnership Education Institute held at the school in April 1996.

The two-day conference brought together over 130 participants representing schools, school boards, private and public colleges, government and community agencies, businesses and town councils. The institute was sponsored by the Partnership Education Department of Elwood High School, the Deer Lake - St. Barbe South Integrated School Board, the Department of Education, the NLTA Educational Partnerships Special Interest Council and the COOPERATION Agreement on Human Resource Development.

The keynote address was given by Doug House, former chair of the Economic Recovery Commission. House praised the progress that has been made in recent years in partnership education and proposed five

challenges to partnership education in the future. These include: focusing on sustainable development and community stewardship; developing confidence in ourselves by acquiring knowledge and skills; updating our understanding of society and the economy and where we are heading; building a culture of excellence; and working towards a new type of regional economic development.

Mildred Minty spoke about education and the new regional economic zones, and Wilbur Boone outlined the Department of Education's policy regarding partnerships. Other presentations focused on cooperative education in the curriculum, STEM-Net as a partnership tool, enterprise education and local business partnerships, youth training strategies, partnerships in global education, technology education programs, and community education.

Many sessions drew the important distinction between partnerships and sponsorships. Presenters emphasized the importance of maintaining a consultative approach among all partners. In his session on developing a partnership mentality, Steven Brooks



Jerrett Caravan, Stephanie Purcell, Angie Oake and Leslie Watkins participated on a student panel and gave their reflections on partnerships and how partnerships influenced their education.

highlighted that point. "There are no limits to the types of partnerships that can be created," he said. "Much depends on the initiative of the school and the community." On the issue of funding, he added, "We have to get to the point where the partnerships are viable without the funding. The financing is important as seed money, but not as life support." Brooks believes that the community's expectations of the school and its role have to be defined. Once that is accomplished, all kinds of possibilities are opened up.

Peter Doyle, Assistant Superintendent with the Appalachia Roman Catholic School Board in Stephenville, examined the components and challenges of partnership education, and posed two key questions: what is it about the education system that needs to be changed and what steps need to be taken to bring about change? "If our primary concern in education is student achievement," says Doyle, "then we must acknowledge that far more than what

is happening in the classroom affects this achievement. If we accept that the school is the point of intersection to deal with social issues, we need to decide what kinds of support are needed to make it work."

Cooperative Education, Enterprise Education and Youth Internship programs are some of the more visible partnerships between schools and the community. Students from the Cooperative Education program and the Youth Internship program at Elwood Regional High School volunteered for several duties during the institute. For example, students introduced the presenters at the

beginning of each session. As the conference closed, four Elwood students offered their perspectives on partnership education as it is carried out in their school. Each student has participated in a co-op education program during the past school year. Their insights and enthusiasm were greatly appreciated by the conference participants.

Jerrett Caravan, a co-op student at Elwood, gained work experience at a local construction company. He says the co-op experience can give students an important edge because they learn skills that they cannot learn in school. He also argues that spending time in the workplace helps some students make all-important career decisions earlier than they normally would. When Leslie Watkins was assigned to work at Shoppers' Drug Mart, she was given an action plan to enable her to gain experience in all departments of the store. Leslie says she learned to work with others and to deal with the general public. "On a practical level, I was able to use some of the knowledge I gained in chemistry when I worked in the pharmacy department at the store."

Those who work with cooperative education programs in the schools are quick to point out that the employer gains a great deal from the students' work. At the Humber Valley Medical Clinic, Angie Oake played a valuable role in general office management. Angie is somewhat embarrassed to admit that she fainted when she

"It's a big responsibility," says Leslie Watkins, "you have to make the school look good and the business look good."

watched bandages being removed from a patient. At the same time, she proudly points out that her computer skills were indispensable to the doctor.

A cooperative attitude is as important as sound academic preparation for co-op participants. Stephanie Purcell, who worked at a local hair salon, pointed out some of the realities of the workplace that she learned. "We weren't busy all the time," she says. "Some students who are not in co-op programs might resent the idea of someone else having the afternoon off. But when we were busy, we often worked longer hours than the school day."

The co-op students at Elwood Regional High School agreed that offering the diverse learning opportunities available through partnership education benefits the students and the community. "It's a big responsibility," says Leslie Watkins, "you have to make the school look good and the business look good." These students are moving on to pursue postsecondary programs in the fall, taking memories of their academic and work experiences with them. "Ultimately, the relationship we built with our teachers is the most memorable," says Stephanie Purcell. "That's the most important partnership of all." Ω

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Richard Parsons Receives National Award for Distinguished Leadership

Richard Parsons, Principal of Elwood Regional High School in Deer Lake, is this year's recipient of the Canadian Association of Principals' Distinguished Leadership Award. In April, over eight hundred school administrators from across Canada gathered in Regina to present Parsons with the award. The award is designed to recognize one school administrator in Canada who, through his or her administration, operates an effective and innovative school. Parsons is the first school administrator in Newfoundland and Labrador to be so recognized.

Since becoming Principal of Elwood in 1991, Parsons has embraced the school improvement process. In so doing, he has developed six recognized local courses, procured over seventy computers for student use, created a Teacher Advisor Program, implemented the Employability Skills Portfolio Program, initiated the province's first Department of Partnership Education and a site sharing partnership with Westviking College, purchased a PLATO learning system, established an Art Procurement Program and a Visiting Artist Program, and secured over \$600,000 in government and industry funding agreements to do these things. In addition to these established accomplishments, two innovative programs are planned for the 1996-97 school year: the Spatial Information Technologies Program and the \$90,000 Home Support Worker Internship Program.

According to the staff of Elwood, all of these accomplishments are a direct result of the leadership style of Richard Parsons. He has broadened the perspective of his teachers



*Richard Parsons
Principal, Elwood Regional High School*

and has motivated them to develop a program of study and opportunity which enables students to be better prepared to face the challenges and changes of a highly uncertain future.

Parsons is proud of the positive steps he has taken in making the administration more open and receptive to students, teachers and parents. Elwood has produced a personalized student handbook, which is not only an invaluable learning and planning tool, but which also makes clear the rights and responsibilities of students. During a recent school improvement retreat, Parsons made sure that parents and students were invited to provide a complete picture of the school's strengths and weaknesses and to offer proposals for school improvement. Parsons is very eager to share the credit for the CAP award. "This award not only recognizes Richard Parsons as an administrator. It also recognizes the teachers, students and support staff of Elwood Regional High School, a team committed to developing an effective, comfortable and interesting work and learning environment."

Reshaping the Mould

the Port au Port Community Education Initiative promotes community growth through education

by
Peter Doyle

In this province, as elsewhere, “education reform” has become a rallying cry for those who believe they have the solutions for the perceived shortcomings of our system of education. Those who advocate reform frequently cite the need to forge new partnerships in order to realize our goals. There is always a risk that when a term becomes fashionable, it can become trivialized. It would indeed be unfortunate if educational partnerships were to become simply another cliché - the buzzword of the day - because providing a high quality educational service does require a rethinking of our system of delivery, and certainly requires a high level of cooperation from many partners.

If we are to realize the educational progress which everyone seeks, partnerships must exist at many levels. The report of the Newfoundland and Labrador Royal Commission of Inquiry into the Delivery of Programs and Services in Primary, Elementary and Secondary Education, *Our Children....Our Future*, (1992), presents a forceful case in the chapters on Equal Access “Equal Opportunities”, and “Connecting Education” (Chapters 16 & 17) that education does not exist in a vacuum.

Coming to terms with concerns about the level of educational achievement of our students means coming to terms with the many issues which have an impact on the student’s capacity to cope.

The report of the British Columbia Royal Commission of Education, *Our Children...Our Future* (1988), notes that “because the school organization, with its captive population, offers society the most systematic point of contact with youngsters, the school represents an ideal and efficient organizational structure by which to deliver a variety of health and other social services to young people. For that reason, there is an organizational imperative behind the school’s expansion into the social domain” (p.335). If we are to accept this responsibility - and we really have no choice - a high level of cooperation among many partners is essential.

In the Bay St. George region of Western Newfoundland, there are serious concerns about economic conditions in many communities, about social problems, and about levels of educational achievement. While various agencies serving our communities have mandates to serve different constituencies and address specific issues,

we have come to the realization that dealing with each of those issues is critical to overall community development, and they certainly do not exist in isolation from one another.

This realization led various community agencies to develop informal working relationships which have, since 1992, become formalized as the Port au Port Community Education Initiative. This umbrella organization, with its twenty partners, is committed to the development of comprehensive strategies for long-term development within the communities of the region. While the agencies have responsibility for social services, health promotion, human resource and economic development, and education - primary, elementary, secondary, and post-secondary- all have agreed that an intense focus on education is the key to community development.

As a result of a needs assessment, three categories of educational partnerships were identified, including:

1. Social Agency Partnerships -

Such partnerships involve a high level of cooperation among the various agencies which serve our communities.

2. Business - Education

Partnerships - In today's context, with education becoming more widely perceived as primarily preparation for a job, this has become the most common connotation of partnerships.

3. School - Community

Partnerships - This speaks to the degree to which the school and the community share a vision for the role which education plays in promoting personal and community development.

Perhaps as a reflection of the priorities of the partners originally

involved in the Port au Port Community Education Initiative, the greatest emphasis to date has been on the inter-agency cooperation required to initiate the various thrusts of the Initiative. Based on the 'ounce of prevention' philosophy, the greatest emphasis has been placed on programs which provide early intervention, including:

- Pre-school Programs - In rural communities which have no pre-school services, schools provide year-long, full-time pre-kindergarten programs for four-year olds who will be entering kindergarten in the following year. Space is provided in schools, and funding provided through a combination of school board support, Department of Social Services sponsorship, parent fees, and community fund-raising. All eligible children are involved in those programs in the communities with the service.
- Family Resource Centres - With the assistance of funding provided through the Brighter Futures program of Health Canada and through the collaboration of a number of community agencies, the Appalachia R.C. School Board has committed to provide space in each of its primary schools to develop Family Resource Centres - areas designed to support drop-in play programs for parents and young children. Those centres also provide books and educational toys which families may borrow for use at home.
- Primary Literacy Plan - Consistent with the early intervention strategies, there has been an intensive focus in schools on the development of appropriate literacy skills among children in primary grades. The central focus of this initiative

has involved the implementation of Reading Recovery, an individualized reading intervention for grade one children having difficulty in the early stages of reading. Also critical to this initiative has been intensive inservice with teachers on accurate assessment of student strengths and needs, and a determined effort to involve parents in the classroom and at home through such practices as take-home reading and reading logs.

The school-to-work transition is a critical issue for high school students and adults and this has led to various business-education partnerships. Recognizing that the traditional school environment does not meet everyone's needs, the Pathfinder Learning Centre has been established in Port au Port. This centre, while attached to Bishop O'Reilly High School, has its own identity as a partnership between the Appalachia R.C. School Board and Westviking College, serving a population of at-risk high school students and adults returning to complete Adult Basic Education.

The high school students are participating in a Youth Internship Program, with funding support from Human Resource Development Canada (HRDC). This program connects them with potential career opportunities, provides work experience, and helps them develop an Employability Skills Portfolio.

Extensive use has been made of other school-to-work programs funded by HRDC. Such programs have included:

- Youth Strategy Linkages - This Youth Strategy program enables young people to gain twenty-six weeks of subsidized employment in work placements consistent with their career aspirations.

The task of education reform must address in equal measure the dual challenge of defining what an education should entail, and of ensuring that all students who enter have a realistic opportunity to achieve the prescribed goals.

- Youth Services Canada - Through this program, twenty young adults are working as a Youth Corps in various communities. The focus has been the promotion of community literacy.
- Enterprise Training Initiative - A number of young people have been supported to attend postsecondary programs in Business Administration.

It must be recognized, however, that social agency cooperation and business-education partnerships are not ends in themselves, but the means by which the ultimate aim of school community partnerships is achieved.

The degree to which the aims of the Port au Port Community Education Initiative will be achieved will be a direct reflection of the extent to which the underlying principles are shared by the total community. A number of initiatives have been designed to create a greater level of awareness within communities of the critical importance of education in today's world. These initiatives include televised community forums,

programs for parents on such diverse topics as computer literacy, literacy in primary grades, effective parenting and career information for parents of teens.

The Port au Port Community Education Initiative has certainly not fully solved the educational, economic, and social issues confronting our communities. Among the lessons learned is that an issue as complicated as improving educational standards requires a comprehensive approach which recognizes that education does not occur in isolation, but is greatly impacted by external factors.

Recognizing this reality in no way absolves educators from responsibility for acting to remedy the situation. On the contrary, it implies an understanding that education represents the most efficient structure through which to deliver a variety of services to young people and, equally as important, to their parents. This complicates, rather than alleviates, the challenge to educators.

The task of education reform must address in equal measure the dual challenge of defining what an education should entail, and of ensuring that all students who enter have a

realistic opportunity to achieve the prescribed goals. While not diminishing the challenge of defining what an education should be, the issue of eliminating the barriers to success which many students face, both inside and outside the classroom, is a far more daunting challenge.

It is a challenge which calls on the education system to become a catalyst for change in our communities, working in partnership with other agencies which serve our communities in various capacities. Much has been said about the efficient and effective use of resources. While this expression has become trite through overuse, it is essential that we make the most effective use of dwindling resources. Emphasis must be placed on diminishing bureaucracy by developing a cooperative approach to the provision of programs and services to our schools and communities. Ω

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Education and Economic Zones

partnerships in self-reliance



by
Mildred Minty

Education is often described as a key to our prosperity, and our residents have been advised to train to better prepare for participation in a more diversified economy. In fact, our schools and postsecondary institutions have never been more able to educate and train people in preparation for employment. Yet, at present, making the connection between training and employment presents a challenge in this province.

Many recent reports have proposed that, through education and training, we must make people more employable, more flexible, and more able to meet changing global labour market demands. These "supply-side" strategies, which focus upon "fixing" the labour supply, are based on the assumption that there are jobs to be had if people have the right skills. In this province, however, the demand for labour has not kept pace with the supply of labour.

Short-term job creation has actually inhibited the adjustment process. We need to increase the demand for labour by creating long-term employment, particularly in rural areas. If we can make more "demand-side" adjustments, by planning strategically for

innovative business development and job creation, we can connect employment opportunity to labour force development. However, long-term labour force adjustment through the demand side will mean doing things differently such as training people to make jobs which generate income. We have just begun to experience success stories in diversifying our labour market.

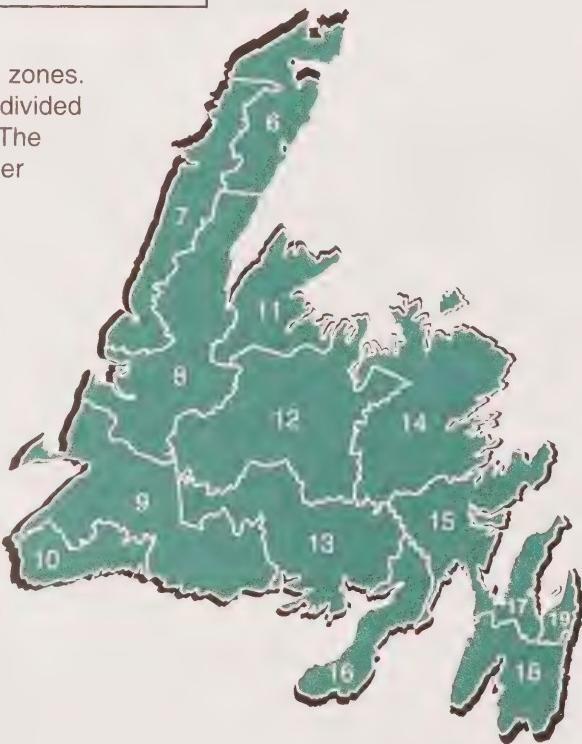
Reaching prosperity of our people through long-term job creation and sustainable economic development will require simultaneous effort on many fronts, involving many partnerships in an integrated approach. At present the potential exists, as never before, for the education and training system to play a strong part in community-industry partnerships which connect skills acquisition to work experience, job creation, labour force development and economic development.

The province of Newfoundland and Labrador is on the leading edge of a tremendously exciting process. A new approach to economic development has begun. As introduced in the province's *Strategic Economic Plan, Change and Challenge* (1992), and fur-



Provincial Economic Zones

There will be 20 zones. Zone 18 will be divided into two zones. The boundary is under consideration.



ther defined by the Community Economic Development (CED) Task Force, twenty zones of economic planning have been created. Each zone will focus upon the development of the regional economy in a community-driven, "bottom-up" approach.

The economic zones will be administered by democratically-selected volunteer Regional Economic Development Boards (REDBs) which will include represen-

tation of the education system. Each REDB is assigned the task of creating and implementing a strategic economic plan for the zone.

Sustainable economic development of this province will depend upon development of its people as the source of its prosperity. A bottom-up, community-driven approach to development will require public participation in strategic economic planning and the creation of both a broad

entrepreneurial base and a skilled workforce. Through education and training intervention, we can provide the citizens of Newfoundland and Labrador with the knowledge and skills they need to fully participate in and benefit from the economic development of their zones, their province and their country. Consequently, it is imperative that we incorporate human resource development into each zone's strategic planning process right at the start. Formation of partnerships which support the role of education and training in fostering regional economic development will be crucial.

For example, the economic zone process will provide an avenue by which the services of federal and provincial agencies can be connected to the implementation of plans made locally. However, the REDBs cannot accomplish this integration without the cooperation and support of provincial and federal governments and organizations. Success of the new regional economic development movement will be contingent upon "top-down" support for "bottom-up" decision-making, i.e. creation and implementation of zonal strategic economic plans by empowered residents and key agencies will depend upon central, pan-provincial support and coordination.

A shift is required from the traditional, hierarchical structure of federal and provincial bureaucracies and line departments to a more horizontal and flexible regional partnership approach. Implicit in the formation of such partnerships is a concern to effectively support regional economic development. Each agency will have to examine the way it does business, and to adopt policies which will support the operation of the zones. Federal and provincial funding agencies will have to work together to connect funding for education and

training, work experience, job creation and business support to zonal strategic plans.

Support of the education system is essential to regional economic development. Traditionally, our youth have not been participants in the decision-making process regarding the economic future of their communities. Clearly, schools and school boards have a direct role to play in helping young people to develop visions and plans, and to collectively focus upon community challenges by developing skills in: literacy; self-confidence; problem solving; cooperative participation; mathematical, scientific and technological literacy; and economic literacy.

Community schools have the capacity to be vibrant resource centres where family literacy, adult literacy, community education, information technology, and community collaboration can support the regional economic development process. Numerous innovative "partnerships in education" projects presently thrive in various parts of the province. Regional Economic Development Boards, school boards, and community schools will be an ideal source of ongoing opportunities for creative partnerships based upon the zones' strategic economic plans.

There are some straightforward leads from the K-12 curriculum to regional economic development. For

Enterprise Education classes, zone strategic plans are living examples of the business planning process, and can be used as motivational springboards for entrepreneurship. Opportunity think tanks, invention workshops, Junior Achievers' activities--there are many creative ways that enterprise educators can encourage their students to participate in planning the futures of their communities and then taking part in the futures planned. Schools can develop local courses in partnership with REDBs, government line departments and industry to connect with economic growth sectors identified in zonal strategic plans. Career education teachers can use zonal strategic plans to explore entrepreneurship and employment career options which can allow students to stay and work in their home communities. The Fortis Education Foundation and many of our schools presently promote employability skills portfolio development. In the context of zonal strategic plans, the immediate applicability of those skills will be even more evident.

Zonal planning will provide a source of good local labour market information which can be used to connect the education of individuals at both secondary and postsecondary levels to the needs of the zone via cooperative education placements, work experience, job creation and

business development programs. Because employment opportunities are limited, particularly in rural areas, educational institutions could consider taking a more active role in job creation by establishing training businesses and community enterprises connected to zonal strategic plans. (Training businesses combine the social objectives of job training and vocational training with the economic objectives of the production of goods and services. They usually employ people for a finite period in order to give the learners workplace skills.)

In these uncertain times of limited resources, people are gravely concerned about the future of our communities and the support structures within them. Never has the challenge been greater to use those scarce resources wisely. Collaboration and cooperation are essential. As Gertrude MacIntyre (1995) noted, education and local development must be "active partners." Together, they can provide a focus for "all concerned with the future of communities" to "come together in a spirit of mutual respect and understanding to tackle problems and explore old and new ways of enhancing the human condition" (p. 187). Ω

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Partnerships for Global Development

by
Anthony Dickinson

Memorial University of Newfoundland is actively involved in the human resources development of "third world" universities, largely through projects funded by the Canadian Partnerships Branch (CPB) of the Canadian International Development Agency (CIDA).

In 1993, the CPB introduced the University Partnerships in Cooperation and Development (UPCD) program, designed to empower Canadian universities to work in concert with those institutions in developing countries which have education and training responsibilities. CIDA believes "that such natural alliances can accelerate the process of economic and social development and improve the understanding of these processes by citizens of the developing world and Canada alike".

The UPCD program is intended to support, on the basis of merit, human resource development initiatives aimed at achieving lasting mutual benefit for all participants. The general goal of the program is thus "to

increase, in a sustainable manner, the capacity of developing countries to educate and train the human resources required to meet their priority development needs". To this end, the UPCD supports collaborative projects which address the following objectives:

- To strengthen developing country institutions responsible for the training of human resources
 - To contribute to the establishment of linkages fostering sustainable partnerships between Canadian and developing country institutions
 - To contribute to the internationalization of Canadian universities in all aspects of their mission and to the promotion of Canadian university expertise in higher education
 - To contribute to the development education of the Canadian university and the community it serves
- In accordance with the new foreign policy statement for Canada
- Support for the development priorities set out by developing countries themselves, particularly in the domain of human resource development
 - Support for the full participation of women as equal partners in the sustainable development of their societies
 - Support of the concept of sustainable development coupled to a commitment to seeing its principles implemented
 - A commitment to help developing countries to protect their environment and to contribute to addressing global and regional environmental issues
 - Support to increase respect for human rights, including children's



rights; to promote democracy and better governance; and to strengthen both civil society and security of the individual

In 1988, Memorial University of Newfoundland established the Canadian Centre for International Fisheries Training and Development (CCIFTD) in partnership with the then separate Institute of Fisheries and Marine Technology (The Marine Institute). The primary objective of CCIFTD is to act as a central point for the development of fisheries initiatives in developing countries which could involve the substantial institutional, government and private sector expertise available in Newfoundland and Labrador. In recent years, the centre has largely evolved into an office for the development and management of Memorial University partnerships with developing country universities funded under the UPCD programs. In line with CIDA policy, all projects contain community outreach activities and support the enhancement of women in addition to institutional scientific, education and training initiatives. Each is funded by CIDA to a maximum of five years and at least \$750 000.

The Institute of Marine Science (Zanzibar) of the University of Dar es Salaam is being helped to develop and operate a Media Unit and Marine Education and Extension Division which has the responsibility to produce a variety of video and print materials aimed at informing the local community (villages, schools, fishers) on the need to conserve their environment for the benefit of future generations. Work has focused on the identification and conservation of mangroves and the development of a manual of simple environmental activities for primary school children. Training and production assistance for the Media Unit has been provided by

the Newfoundland and Labrador private sector. Videos produced for local use include seaweed cultivation and economic impact on women growers, mangrove conservation, and the role of women in the Zanzibar fishery.

The primary objective of CCIFTD is to act as a central point for the development of fisheries initiatives in developing countries which could involve the substantial institutional, government and private sector expertise available in Newfoundland and Labrador.

The Department of Fisheries of Moi University, Kenya, is also being helped with teaching and curriculum development for the only specialized fisheries-related undergraduate degree programme in East Africa. Activities have concentrated on Memorial

University personnel doing such work at Moi University, together with businesses from the province's private sector. In addition, two Department of Fisheries faculty members from Kenya are pursuing Master of Science degrees. Working through these degrees will not only enhance their intellectual capacity but also earn them promotion on their return. As a spinoff from this project, a Memorial University terrestrial ecology field course will be given in Kenya, and will involve ten Newfoundland and Labrador students and ten senior students from Moi University. In addition to accomplishing scientific work, both groups will benefit from the cultural exchange, and the Newfoundland and Labrador students in particular will get exposure to the significant development-related issues of East Africa.

The Federal University of Ceara in northeast Brazil is involved in a cooperative activity with Memorial University. Its Marine Science Laboratory and Department of Food Technology are being assisted by the Memorial University Department of Biochemistry to improve methods of using waste products from lobster and finfish fisheries for human consumption at the village level. Scientists have been assisted with product development, and community-level training programmes have been undertaken with women's groups to show them how to make the food products for themselves. In addition, the aquaculture unit of the Marine Institute School of Fisheries has provided input into the improvement of finfish and shrimp aquaculture activities undertaken by both the university and local industry. In order that scientific/environmental information may be distributed to the wider community, a media unit has also been established within the province's Department of Education. This will



This seaweed farm is part of a seaweed aquaculture project in Zanzibar.

form the nucleus of a marine education and awareness program. Training is provided by Anigraph Productions. A variety of symposia and seminars have also been held, the most recent being a comparative examination of issues pertinent to fisheries decline in both northeast Brazil and Newfoundland and Labrador. This linkage mirrors the historical salt cod trade between the two participating regions.

A linkage has also been established with the Universidad Austral in southern Chile. Memorial University's Ocean Sciences Centre will provide scientific assistance to allow the Chilean university to make

a better contribution to the development of the local mollusc aquaculture industry. An extension programme will also be developed, wherein aquaculturists on Chiloe Island will be helped by Chilean, Memorial University and Marine Institute personnel to enhance their participation in the industry. Due to the similarity of aquatic conditions and species with Newfoundland and Labrador, the opportunity may also arise for exchanges between the commercial operators in both countries.

The CCIFTD has also been able to involve Memorial University in a five-year \$5 million partnership led by the University of Victoria and also

involving Malaspina University College and five Brazilian universities in a large-scale program to develop an aquaculture training centre and related programs at the University of Santa Catarina in Florianopolis, Brazil, and with satellite laboratories in various northeast locations. A variety of scientific and training exchanges is also proposed.

The development of university human resources cannot be successfully undertaken without advancing the academic background and qualifications of faculty members. In this regard, the CCIFTD also operates a CIDA-funded Marine Science Scholarship Program which provides the opportunity for personnel from those developing country universities with which Memorial University has some form of relationship, to study for graduate degrees in any marine related discipline available at Memorial University. The program involves 15 students (7 from Brazil, 3 from Tanzania, 3 from Chile, 2 from Mauritius).

Memorial University will continue to develop partnerships to make a major contribution to global fisheries and marine human resource development, especially for developing country universities. Ω

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Partnerships for the Environment



a strategy for waste reduction and recycling in the Port aux Basques school district

When Grade 12 students at LeGallais Memorial school were asked to create a slogan for a recycling depot, they came up with a winner. "Thinking Beyond Today" is the slogan for the new recycling depot, part of a waste reduction and recycling project initiated by Len Pitcher of the Port aux Basques Integrated School District.

Participants began with a six phase action plan in January 1995. Construction of the depot began in July 1995 and recycling programs were implemented in the schools in September. The project's immediate success has been attributed to the collaborative efforts of its many partners.

The Port aux Basques Integrated School District encompasses twelve communities from Cape Ray to Grand Bruit. There are twelve schools which had an enrolment of 1800 students in the 1995 - 1996 school year. Len Pitcher, the program coordinator of the K-12 science, health and physical education programs, developed the project and is very proud of its

success. It is the first district-wide recycling initiative in the province.

The project has three long-term goals. The first is to raise environmental awareness in the district in order to encourage the successful development of comprehensive waste management plans. These include such actions as curbside pick-up and composting. The second goal is to develop lifestyles and attitudes necessary to achieve sustainable development and the third is to offer a more responsible role to K-12 education in promoting active partnerships with Regional Waste Management Boards and Regional Economic Development Boards.

The initiative is building on a strong interest in the environment within the district's twelve schools. A successful recycling program already existed at Grandy's River Collegiate in Burnt Islands and new programs had started in St. George's Elementary in Burnt Islands, St. Michael's Elementary in Rose Blanche and LeGallais Memorial in

Isle aux Morts. When the depot became operational on September 25, 1995, nine additional schools implemented recycling programs.

After seven months of depot operation, 100 metric tonnes of recyclable materials have been diverted from the regional incinerator and local landfills and \$6000 revenue has been generated for the district schools. Six schools and 26 classes have visited the depot as an introduction or supplement to environmental learning objectives.

The depot is located on the school grounds of St. James' Elementary and the district maintenance building. Support for the project came from Human Resources Development Canada, Shell Environmental Fund, Nova Recycling, Town of Channel-Port aux Basques, Sheaves Home Hardware and Clifford Sheaves Construction Ltd. Marine Atlantic has supplied a fork lift and Nova Recycling has provided cement, weight scales and a cardboard baler. Nova Recycling also

hired the staff and ships the recyclables after storage at the depot.

Employment has also been created through partnerships. A full-time job has been set up at the district depot through Nova Recycling and an on-site training program has been established with Westviking College. Four students have completed the program. In addition, postsecondary Environmental Technology students who are completing work terms with the Town of Port aux Basques are using the project to collect data for a municipal waste management study. The Social Services Youth Correctional Program allows young offenders to complete their work requirements at the depot. As of April 30, 1996, seventeen junior and senior high school students have completed their required work.

In the district's schools, primary and elementary school students are the most active participants. Their classrooms and corridors have recycling boxes. Some schools have 'green teams' while others have rotating classroom responsibilities. The waste reduction and recycling content in the curriculum is highlighted through visits to the district depot and other school planned activities such as community clean-up afternoons. Students visit the depot to get cardboard for science fair projects and use other recycled materials for their SEEDS green school projects.

As a result of this initiative, all schools in the district have started waste reduction and recycling programs. Storage facilities have been placed at all schools and each school has an account for crediting the recyclables brought to the depot. A no-cost district transportation system is in place with cooperation from town councils, the provincial government and volunteers.

Recyclables collected in the program are cardboard, all grades of paper, plastics #1 and #2, aluminum cans and specific glass containers. A business support base is well-established. Cardboard from the business sector accounts

for 75% of the tonnage diverted. A household support base consisting of parents and other concerned citizens has been established in all communities.

As a result of discussions with Marine Atlantic, recycling will begin on the gulf ferry services starting in the summer of 1996. Pitcher believes this is an important dimension of the project because the results will be visible to the travelling public and hopefully will encourage lifestyle changes to further protect the environment.

Supported by Human Resource Development Canada and the Conservation Corp of Newfoundland and Labrador, four students will work as a green team in the recycling program on the ferry service and two students will work at the depot during the summer months.

A district recycling newsletter is distributed to schools and businesses throughout the district to provide information about recycling and the value of partnerships. It even reminds readers to recycle the newsletter as "mixed paper." For continuity over the summer months the local cable channel is carrying regular announcements to promote community awareness and participation.

A District Environment Committee, formalized in September 1995, currently consists of twelve Recycling Coordinators from each district school and the district Science Coordinator. Each

Recycling Coordinator is responsible for organizing the school's Waste Reduction and Recycling program and promoting it in the community.

Within the guidelines of provincial legislation, industry stewardship programs and municipal and regional by-laws supporting waste reduction and recycling, the education sector is well placed to take an active leadership role in supporting environmental learning objectives and private industry recycling initiatives. Community councils and waste management regions also have a vested interest (continued **RECYCLE** on page 31)



the cardboard baler at the depot

The Automation Training Centre at Westviking College, Corner Brook Campus

Westviking College forms partnerships with industry to focus a new training initiative

To compete nationally and internationally, small businesses in Newfoundland and Labrador are being encouraged to train their employees in new automation technologies. Many industries are taking advantage of advances in automation technologies to improve quality and efficiency, and to reduce operating and production costs. The introduction of control and automation systems has resulted in an increased demand for training and upgrading. This need is being addressed by a new Automation Training Centre at Westviking College in Corner Brook.

The initial plan was to develop an Electrical Training Centre which would serve the training needs of the Newfoundland and Labrador offshore construction industry, particularly clients on the north and west coasts of the province. After discussions with the Department of Education, the Project Management Steering Committee decided to change the focus to include the training needs of

small business and light manufacturing, specifically in the area of automation technologies. With financial assistance from the Offshore Development Fund, Westviking College was able to purchase and install Phase I equipment during the 1994-1995 academic year. The Automation Centre has evolved into a technological centre specializing in sophisticated automation processes which are essential for modern manufacturing.

With Phase I completed, the centre is equipped to deliver up-to-date training in electrical, electronics, instrumentation and process control. Training in advanced and diversified automation topics, specifically process simulation, man-machine interface, automotive control system, and mechanical/electronic interfacing is planned as part of Phase II and Phase III of the project. Funding for Phase II has come from the COOPERATION Agreement on Human Resource Development.

The centre has four laboratories

in operation. The first is the Automated Process Control Laboratory. It has self-contained work stations which are designed for training in the measurement, control, and troubleshooting of Pressure, Flow, Level and Temperature. The stations can operate independently or in certain combination configurations to simulate complex processes found in industry and small manufacturing plants. The learning of process control is general so that skills can be applied across industries.

The Electronics Lab has a Lab-Volt FACET system to help students learn basic and advanced electronic principles. FACET is a comprehensive collection of educational programs that combine theory and application with practical skills. The modular, computer-controlled system allows flexibility in individualized instruction and lesson planning.

A PLC and Networking Lab trains students in the installation, operation, and maintenance of programmable logic controllers (PLC)

and industrial computer networks. Phase II and Phase III of the project will enable the centre's personnel to expand the equipment to include different types of manufacturing. The future of automation depends on the ability of in plant and remote controllers to communicate with each other and with other supervisory systems. Additional industrial network and remote communication hardware and software will be purchased to ensure this development. Phase II will also provide for expansion into man-machine interface software (MMI) which will enable small businesses, manufacturing plants, and commercial buildings to have more sophisticated control capabilities. For example, they will be able to diagnose production problems automatically, thus minimizing downtime.

An Automation Applications Lab provides the student with training in the installation, troubleshooting, maintenance and operation of automation installations. This includes equipment and systems used in residential, commercial and industrial areas. The emphasis is on the systems used by small businesses and light manufacturing plants. Phase II will provide for expansion into training in energy management and in supervisory control and data acquisition (SCADA).

Partnerships are essential for the continued success of the centre's program. In March 1996, industry representatives met with personnel from the College to present their current and future requirements. A three-year pulp and paper processing program is being established which will bring the College into partnership with the pulp and paper mill in Corner Brook. Students will learn by using the equipment at the mill.

A centre manager, who will be hired by September 1996, will oversee the lab systems and develop a data-

base with industry and continue the direct marketing approach to sell the centre's potential to industry.

Students may choose from a wide variety of courses offered by the centre. They may have their performance graded and use the credit towards a Continuing Education Certificate in Automation Technology. The courses may also be used as credits or partial credits towards a diploma program. Others may wish to audit the courses by participating in course work but not the evaluation.

The Automation Training Centre will create a trained labour force capable of using automation technologies to improve product quality, increase efficiency and reduce costs. By providing for the upgrading of workers already employed, the centre will be instrumental in improving worker productivity and industry competitiveness. Ω

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Ken Hann - Paragon Information Systems

Dwight Howell - Ultimateast Data

E. Carl Hynes - Newfoundland Hydro

David Lewis - Corner Brook Pulp and Paper Ltd.

B. MacKay - Treasury Board

David P. Mason - Consultant, CNE

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Brian Power - Data Communications

David Press - CCNE

Gail Vokey - Treasury Board

Gerald M. Allan - J.W. Allan Co. Ltd.

Pat Broderick - Newfoundland Hydro

Cathy Brophy - CBC

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Mark Coffey - Newtel Communications

John Collins - Cable Atlantic

Gary Comeau - Westviking College

Jack Crane - Abitibi-Price Inc.

Frank Dawe - Dept. of Health

Project Profile

Computer Support Technicians

curriculum development for a new diploma program at Westviking College

In light of the tremendous growth in the computer industry in recent years, government departments and businesses have an increasing need for computer specialists who have a broad range of skills. These specialists must be trained in operating systems, networking, software, hardware, troubleshooting and repair. Their key service to industry is to ensure minimal computer downtime. A two-year diploma program for Computer Support Technicians is being offered by Westviking College, Corner Brook campus, to meet the demands of industry for this type of computer specialist.

The program, scheduled to be implemented in September 1996, is designed to build skills in computer science and electronics, including tasks such as diagnosing, repairing and servicing computer hardware, with a focus on Local Area Networks (LAN) and Wide Area Networks (WAN). More emphasis is given to practical applications that specifically suit the needs of the local community. The comprehensive program takes six semesters to complete with a five-

week work placement in the final semester.

Semester I

Operating Systems I Windows/Win95
Communications Skills I
Electrotechnology I
Mathematics I
Application Software I
AutoCAD

Semester II

Communications
Mathematics II
Electrotechnology II
Digital Electronics
Application Software II
PC Configuration and Management
Local Area Networks and Data

Semester III (Intersession)

Analog Computer Circuits I
Accounting
Entrepreneurial Studies

Semester IV

Analog Computer Circuits II
Microprocessors
Network Operating Systems I
(Windows NT)

Visual Basic
Cable Fabrication, Planning and Installation
Computer Peripherals

Semester V

Oral Communications
Network Operating Systems II (Novell)
Computerized Accounting II
Computer Equipment Troubleshooting, Maintenance and Repair
Enterprise/Global Email Systems
Internetworking
WAN, MAN and the Internet
Unix/Linux

Semester VI

Students will be placed in a five-week job training session to further develop skills.

The program began as a bridge between an electronics program and business education. A needs assessment was carried out through a survey of west coast industries. Training initiatives in computer technology throughout the province have focused typically on the following areas: Computer Systems Analysis, Computer Programming, Industrial Control and Computer Design. The survey indicated that industries are looking for individuals whose skills encompass a cross-section of these areas.

Randy Rowsell, the instructor of the computer technician program, explains how a partnership approach will accommodate industry. "We want to offer a modular approach to the program so that people who are already in the workplace can take advantage of it. Those who cannot take the time from their jobs to attend a 15-week course will be able to attend those sections on areas in which they need training."

(Continued, COURSE on page 31)

Building Partnerships for School Improvement

community comes together to support school improvement programs at I.J. Samson Junior High School in St. John's

by
Fred Durant

"....one giant leap for mankind."

On the evening of July 21, 1969, in Seal Island, Labrador (my first teaching position), I was sitting on a woodpile and looking at the moon. Little did I realize then that the faculty and students I would be working with 27 years later would have at their disposal far more computing power than did those pioneers who walked on that lunar surface that night. We have been saturated with the technological tools and information resources available to us. Time, specifically the lack thereof, has become our enemy: time to plan; time to learn; and time to manage the change and growth processes.

While education reform is occurring around us, those of us committed to adapting the information era to our

learning environment are truly involved in education retooling. This retooling involves phenomenal professional development strategies tied to day to day curriculum delivery and development. I use the word retooling because we are gradually changing the way we do things, we are not merely changing the manner of governance.

In the Spring 1995 issue of *Prospects*, I wrote:

"The staff and students at I. J. Samson are at the lower end of a very sharp learning curve. Much of the currently prescribed curriculum does not have built in links to technology. It is up to innovative teachers to develop methods and use technology to enhance the learning environment. Teachers must be the primary target of technological learning so that we can achieve the automation necessary to

help our students prepare for the workplace. This innovation is best achieved when broad community-based partnerships are formed."

As we approach the 'ideal' of our technological capacity, these partnerships and sharing of human resources become even more critical. Our local area network now consists of 40 PCs. By September, 1996, we expect this to increase to 60. All classrooms will be linked to the network, and via the Stellar School Project, linked to the world. In addition to the professional development necessary to make maximum use of this increased access, the management of this system will require time and expertise that is currently limited. In many corporate settings, a system of this size would require the allocation of full-time personnel as an integral part of the technological support infrastructure.

Notwithstanding these difficulties, our successful growth is reflected by some key indicators. First, it must be realized that the technological growth at I. J. Samson is one element of the school's improvement process. The School Improvement Committee oversees the objectives and implementation of all improvement initiatives. As a result of this collaborative effort, we have seen a decrease in unexcused student absenteeism; a decrease in the occurrence of discipline problems; an increase in parental involvement; an increase in the number of students designated to accelerated programs in language arts, French, and mathematics; an increase in the number of students involved in co-curricular and extra-curricular activities, especially choir, band, and drama; and an increase in the expression of interest by parents to have their children become students at I. J. Samson. In the "Quality of School Life Survey", our students indicated a more positive perception of the

school in every category than did the district and provincial frequencies.

The three years of our partnership with Newfoundland Power has been a learning experience for both groups. Our business-education partnership has received national recognition through the Conference Board of Canada's National Awards Program for Excellence in Business-Education Partnerships. Our first national recognition came in 1994 through Northern Telecom's National Institute on Excellence in Education. Over this three-year period the objectives of the partnership have been more clearly defined:

1. to create relevancy between curriculum objectives and the business world that would stimulate students' interest in learning
2. to create the technological infrastructure more reflective of the current technology-driven, information age
3. to create among teachers, students and parents an appreciation for technology as a powerful learning tool
4. to create a model of human resource sharing that could be duplicated by other learning cultures
5. to create a vision of the school as a community of learners representing all the major stakeholders

Each of these objectives has been addressed and a significant degree of success realized. Our Project Management Team continues to oversee the specific projects arising from each objective. To 'contextualize' the curriculum, various resource personnel from Newfoundland Power continue to introduce various topics in

mathematics, science and language arts.

For the third consecutive year, Newfoundland Power has sponsored the Junior Achievement program, "The Economics of Staying in School". This year the program was approached in a unique way. Rather than have presenters (all Newfoundland Power employees) visit the students over a four to six-week period, the program was delivered over a six-day period. A unit of curriculum was shaped around the program by department heads so that the presentations carried over into regular classroom activities. The timing of this project coincided with Education and Career Week activities. This encouraged our grade nine students to consider the importance of becoming lifelong learners.

In terms of furthering the vision of the school as a community centre for lifelong learning, a survey was conducted among parents to determine the level and focus of interest in developing evening technology courses for parents and others. September 1996 will see the beginning of this program. As well, as part of our Global Education day, a group of neighbours (residents and members of the business community) were invited to participate in a panel discussion with faculty and students to come to grips with the impact of having a junior high school in their neighbourhood. The session ended with a commitment for an I. J. Samson Neighbourhood committee to be formed in September of 1996. It is hoped that this will expand community involvement in the school's learning culture.

With the growth of appreciation for technology as a learning tool among faculty and students, there is a greater strain on the computer facility. Over the past year we have changed from Novel to Windows NT

The technological infrastructure that is now in place will allow us to remain on the leading edge of the integration of technology and curriculum delivery.

as our network operating system. As well, we have moved from the Corel Suite to the Microsoft Office Suite as our primary 'tool' software. The Avalon Consolidated School Board has installed a second file server to help accommodate our needs, especially our anticipation of being named a Stellar School. The technological infrastructure that is now in place will allow us to remain on the leading edge of the integration of technology and curriculum delivery.

With this ability there comes a price. We find that there are tremendous strains on the availability of time, finances, and expertise. Even with support from the board (two technical support people on staff) and from our business partner (our Technical Support Team) we still rely on the goodwill of faculty members, especially those who have taken responsibility for the network, to give unstintingly of their own time. The reality is that without an extended support network, it will be difficult to maintain the same learning pace. We are only one of many schools in this province to have reached this level of technological capability. Many are indeed much further advanced than we are.

What we all have in common is the need for a broader network of support. It is becoming more critical that leaders at the university, community college, and government levels

create a more holistic approach to the development and maintenance of such a support network. Those departments who have primary responsibility for human resource development (Education; Environment and Labour; and Industry, Trade and Technology) must cross departmental barriers to provide more cohesive support to the human resource development that is occurring through individual initiative at so many secondary schools in this province. The processes that many of these schools have established to reach their current level of success provide examples of low cost, highly effective retooling strategies. It is critical that their momentum be unstintingly supported and encouraged as well as proliferated throughout the province. Ω

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(WEB continued from page 2)
Minty, author of *For Earth's Sake*, and Frank Jenkins, one of the authors of *Nelson Chemistry*, offer support for these texts through a question and answer forum available at this site. A link to the Nelson test bank is also available.

The resources of the web are not limited to these few sites. One of the unique features of the internet is the ability to quickly search for resources on almost any topic. For example, using Web Crawler to perform a search for Genetic Engineering yielded 45,302 matches. Clicking a reference entitled, "What is Genetic Engineering?" leads to a page established by the Australian Biotechnology Association (<http://www.aba.asn.au/index.html>). The site contains informative explanations of genetic engineering and the DNA helix. Other links at this site lead to the association's homepage and a glossary of terms used in biotechnology.

As the amount of information on the internet grows, the methods of accessing this material are becoming better organized. These improvements are making the internet a very powerful teaching tool that is becoming easier to access. Ω

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The Manufacturing Technology Centre

Memorial University's Faculty of Engineering and Cabot College establish a state-of-the-art manufacturing technology facility

The Faculty of Engineering and Applied Science at Memorial University and Cabot College of Applied Arts, Technology and Continuing Education are developing a Manufacturing Technology Centre (MTC) which will establish a Newfoundland base of expertise in manufacturing engineering and related technologies. The MTC will be developed in conjunction with companies involved in manufacturing. The linkage with the manufacturing industry will be coordinated through the Newfoundland Manufacturers' Association (NMA). The objective of the MTC will be to provide direct and indirect support to the growing manufacturing industry in Newfoundland and Labrador. The MTC will also provide continuing education to professional engineers practising in the province.

The Faculty of Engineering and Applied Science began offering engineering degree programs in 1969/70. Since that time, 1,829 students have graduated with a Bachelor's degree, 261 have received a Master's degree and 31 have earned a Doctoral degree. The graduate program has

grown since the early 1970s. Forty percent of the total number of Master's degrees and 50% of the total number of Ph.D. degrees have been conferred in the last five years. Despite recent budget cutbacks and consequent limitations on expansion, the faculty continues to acquire individuals with expertise in areas such as production technology, materials, robotics, control, computer vision, computer systems and industrial automation. All of these areas are directly related to new trends in manufacturing. The MTC and recently acquired faculty members will form the basis for new undergraduate and graduate course offerings.

At the undergraduate level, it is proposed that a Manufacturing and Robotics Option will be developed for the Mechanical Engineering Program. The MTC will form the basis for a substantial laboratory component for existing and new programs and courses. The faculty anticipates significant interest in this option. In 1995, 39 students enroled in an elective course in robotics, and polling of current students indicates an even higher enrolment for 1996.

The graduate program has developed alongside the undergraduate. As manufacturing and automation technology has become of greater interest to local and national industries there has been an increase in undergraduate and graduate student interest in manufacturing related topics. Offerings at the graduate level specifically related to manufacturing include courses dealing with automation, advanced concepts in mechanical design, optimization techniques, microprocessor systems, computer-aided design and artificial neural networks.

Consideration is also being given to the Master's level program at McMaster University which links industrial research requirements with the interest of faculty members. Graduate students are sponsored by industries interested in the results of the students' research. If this approach is feasible in Newfoundland and Labrador, it ensures a strong linkage between the university and industry with respect to advanced manufacturing techniques and technologies.

Cabot College has a long history of training in engineering technology and will participate as a full partner in the MTC. Almost 1000 students at the college's Engineering Technology Centre on Ridge Road are enroled in technology programs. Students in Mechanical Engineering Technology (all options), Industrial Engineering Technology and others will benefit through access to the state-of-the-art equipment and expertise available at the MTC. Cabot has started to procure equipment to add to facilities available at its Prince Philip Drive campus and faculty have begun speciality training to prepare for new program options.

In September 1996, students enroled in the Mechanical Engineering Technology program at Cabot College will be able to choose



(Left to right) Andy Fisher, Memorial University; Ray Gosine, Memorial University; Burford Ploughman, Newfoundland Manufacturers' Association; Sesh Seshadri, Memorial University

to complete their program with a concentration in manufacturing technology. A number of new manufacturing courses will be introduced.

Students will also take courses pertaining to business operations in a manufacturing plant. (see "Technology Capability", Prospects, Volume 2, Number 4, Winter 1995, page 9)

Most importantly, the MTC will facilitate the establishment of a much needed pool of local expertise in areas relating to manufacturing. The MTC will provide demonstration technology in three core areas of manufacturing: computer integrated manufacturing, product development technology and robotics. Progressive mechanical engineering curriculum, supported by state-of-the-art manufacturing equipment, will provide a strong educational foundation for senior engineering undergraduate and graduate students. These students and the MTC resources will provide a much needed local engineering support base for the growing Newfoundland and Labrador manufacturing industry.

There are approximately 380 non-resource-based manufacturing companies in the province employing 6,000 full-time employees and this is one of the fastest growing sectors of the economy. If resource-based manufacturing is included, the number of companies increases to 750 with 20,000 employees. The growth of the Newfoundland and Labrador manufacturing industry has been attributed to a number of factors, including new companies and strong consumer support for home-grown products.

The MTC will be developed and run as an interactive demonstration facility to show the need and benefits of education, training and university/industry collaboration in manufacturing engineering. It is proposed that future operation of the MTC and upgrading of the equipment would be partially supported through fees paid by industry for use of the equipment.

The MTC would form the major laboratory facility for undergraduate and graduate students enroled in pro-

grams related to manufacturing technology and would also be available to Cabot College in support of the manufacturing technology training programs. Practising professionals who intend to study part-time can use the facility to upgrade their skills.

Another important function of the MTC will be to provide the local manufacturing industry with educational and industrial assistance.

The MTC will include advanced demonstration technology in the areas of Computer Integrated Manufacturing (CIM), Flexible Automation, and Rapid Prototyping systems which may be accessed by local industry through collaborative projects with the university. These areas represent three significant components of manufacturing and will provide students and local industry with a degree of exposure to state-of-the-art technology. It is proposed that this technology specification provides the necessary balance between systems and component technologies.

COMPUTER INTEGRATED MANUFACTURING (CIM)

The integration of various "islands of automation" is critical to manufacturing responsiveness, decreasing defects, and improving plant production. To this end, the MTC will include an integrated suite of machinery which can be used to demonstrate and explore the benefits of CIM. At its simplest, CIM could be represented by two machines whose interactions are coordinated by a computer. However, it can also be represented by a fully automated plant.

The actual production technology employed in a specific plant is obviously tied to the product being produced. Given that the MTC's objective is education and outreach, there is some flexibility in selecting the types of equipment used at the centre.

This flexibility can be exploited to ensure that advanced technologies are showcased in order to develop a provincial understanding and capability in these areas. The CIM system expansion proposed will have a number of stations working off the central Programmable Logic Controller (PLC) controlled conveyor system. The stations will include a CNC milling station, a gauging station, and robotics stations. All stations will be linked through a computer network and work-in-progress and quality information will be monitored through non-contacting barcode technology. The system will be controlled by integrated manufacturing planning software.

PRODUCT DEVELOPMENT TECHNOLOGY

During the last decade, the field of rapid prototyping (RP) technology has emerged as a means of early verification of product designs and the rapid production of prototypes for testing. The primary benefits of RP technology are a reduction in the cost of prototype development and substantial time savings (70% to 90%). The availability of such a facility could be significant to a number of local manufacturing companies who currently have to look outside of the province for product design support and prototype development.

There are a number of RP systems available. One system being considered uses stereolithography. This system converts 3D CAD data of physical objects into vertical stacks of slices. A low-power ultraviolet laser beam is then traced across a vat of photocurable liquid polymer to produce a single layer of solidified resin. This single layer, which is the first slice of the prototype under construction, is then lowered into the vat. The layer is recoated with the liquid polymer and another slice is added to

the prototype. Another system being considered uses paper and an adhesive to form each layer. The paper is then cut with a laser to a tolerance of 1/1000 of an inch. The material that forms the 3D prototype is similar in properties to wood. In addition, the SDRC Ideas Master Series Software

the fundamental principles of the technologies that may be integrated into a complete manufacturing system. It is proposed that the MTC will provide a laboratory environment for engineering education in the areas of robotics, computer vision, control/sensor/actuator systems and adaptive pattern recognition technology. These technologies play an important role in many flexible automation operations.

The MTC will take advantage of several articulated robot arms that have been donated to the Faculty of Engineering by large manufacturing companies in Canada. These robots have been reconditioned by the faculty for the purpose of technology demonstration to undergraduate students and for graduate-level projects in the area of robot control. A six axis SCARA robot system will also be purchased for educational and light industrial applications.

*In order to ensure
and facilitate good
communication
with the manufac-
turing community,
the MTC will work
with the NMC to
develop an
electronic forum for
manufacturing
issues.*

will be used for overall development and applications support of the product development technology.

ADVANCED MANUFACTURING/ROBOTICS TECHNOLOGIES

The automation of industrial processes, particularly processes related to products with some degree of variation, requires the application of technology that can adapt to process variation. In educating engineers for such industries, it is important for students to develop an understanding of

the MTC will contain a VE-262 monochrome, stand alone industrial machine vision system. This system is a local product from Canpolar East Inc. and is an example of the state-of-the-art in industrial machine vision systems and applications. In collaboration with Canpolar East Inc., the Faculty of Engineering is developing computer vision curriculum and associated laboratory exercises and software that may be sold by Canpolar East Inc. as a stand alone product. This project will produce curriculum and support technology that will be used by educational programs and courses related to manufacturing engineering. A PC-based vision system produced by Sharp will also be purchased. This system includes features such as colour and texture processing and stereo vision that are not available on the VE-262 system. Exposure to a variety of technologies will give students and industry professionals experience with imaging processing

technology and adaptive pattern recognition which can be integrated into manufacturing operations.

ELECTRONIC MANUFACTURING FORUM

In order to ensure and facilitate good communication with the manufacturing community, the MTC will work with the Newfoundland Manufacturers' Association (NMA) to develop an electronic forum for manufacturing issues. Homepages will be developed for the NMA and the MTC. Interested manufacturing companies also will be offered assistance to set up their own homepages. Approximately 50 modems and Internet access packages will be purchased for small manufacturing firms identified through the NMA. These firms, along with others which will provide their own communications resources, will form the core of an envisioned electronic community. The MTC homepage would clearly describe the scope of its activities, how the expertise and capability of the centre can be accessed, upcoming events, and provide a forum for dialogue among manufacturers. Links to other supporting institutions would be provided with a description of their roles and capabilities. With the support of the NMA, a searchable database of Newfoundland and Labrador manufacturers will be created. This information will be accessible by others elsewhere in the world and will be an opportunity to showcase the province's manufacturing capability.

The final selection of equipment will be developed in consultation with an advisory board established with the support of the NMA. These decisions will be strongly influenced by the current and projected needs of the manufacturing industry in Newfoundland and Labrador. The MTC will begin operations in September 1996 and will have all

equipment in place by January 1997.

Sesh Seshadri, Dean of the Faculty of Engineering, believes that the centre will be dynamic and will evolve as the needs of industry in the province change and grow. "Memorial is getting into manufacturing in a serious way," says Seshadri. "We have fine people here in the faculty involved in this field. The interest and expertise is here to make a difference in manufacturing in this province." Ω

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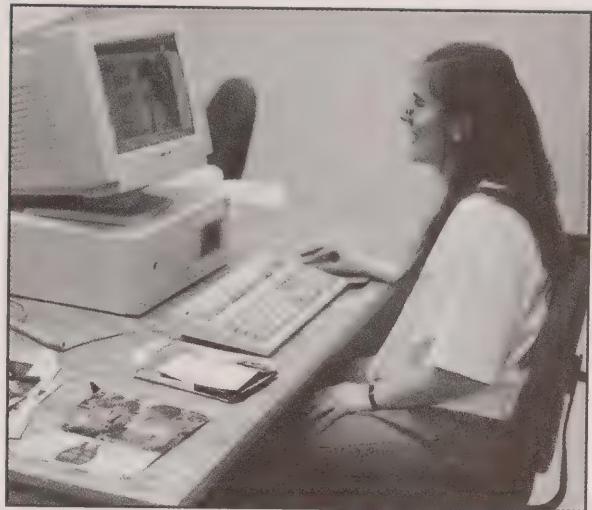
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Memorial University

Daniel Wong
Cabot College

David Gill
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The Labrador West Professional Development Centre



building partnerships to facilitate professional growth

by
Albert Johnson

Labrador West is one of the most industrialized areas of our province. The resource-based industries in Labrador City, Wabush and Churchill Falls require many highly trained individuals. Besides resource-based industry, the district also supports professionals working in health, education and government. In order to stay competitive in the global marketplace, these groups need to utilize new technology. The Roman Catholic School Board for Labrador, has organized partners from business, labour and government to establish a Professional Development Centre in Labrador City.

The lack of adequate facilities to conduct professional development activities prompted the school board to establish regional partnerships to develop and operate a professional development centre. To ensure that the facility would provide a venue for most types of professional development, partnerships were brokered with Labrador College, the Iron Ore

Company of Canada (IOCC), Wabush Mines, the United Steel Workers of America locals in both Labrador City and Wabush, the Churchill Falls Labrador Corporation, Eric G. Lambert School in Churchill Falls, and the Labrador West Integrated School Board.

The centre has two large meeting rooms, a management office, a ten station networked computer facility and kitchen facilities. The meeting rooms can accommodate 80 people and the computer laboratory is equipped with the latest office and communication software.

Diane Gear manages the centre. One of her first tasks was to promote the centre to business and government departments in the region. Business people, and professionals working in health care and government were introduced to the centre through tours and demonstrations. "People who have seen the centre are impressed," says Gear. "It is apparent that they are considering the possibil-



Harry LaCosta leads a group of teachers through a professional development session dealing with evaluation.

ties that the centre affords."

Kevin Walsh is a Management and Trades Training Specialist with the Iron Ore Company of Canada and is pleased the company has access to a facility of this quality for their professional development activities. IOCC is very supportive of this endeavour and makes use of the centre on a regular basis. The company uses the centre to offer training in trades technology and management development courses. Topics on the IOCC agenda include team building, time management, leading effective meetings and interpersonal skills training.

Walsh is very positive about the partnership with the school boards. He claims the expertise of the educators working at the centre and equipment in the centre make it a very effective and comfortable setting. Walsh points out that the training conducted by IOCC is driven by the changing marketplace and the need to remain competitive. "The difference between our company and others is our people," he remarks.

"Keeping them up with new technology and new management skills is extremely important."

The school boards in the region are making good use of the centre. Administrators, teachers and students are using the computer facilities to develop skills with new graphics and office software, and are learning to take advantage of resources that are available on the World-Wide-Web. To encourage an on-going program of professional development, the school board has implemented a train-the-trainer program. Gary Furlong, assistant superintendent of the Roman Catholic School Board for Labrador, believes the strategy is very effective. "If we are going to sustain a professional development program in our area, we have to have the expertise right here. When our teachers and administrators attend training sessions outside of the area, we want them to come back and be able to share that knowledge and those skills with their colleagues. To encourage this approach, the board has offered inservicing on running effective workshops

and leadership skills. The idea is to ensure that our staff has the skills to share effectively what they have learned."

The training session on delivering effective workshops covers topics from the preparation of a workshop through to the closing. During the two and one-half days, teachers are offered strategies to help keep a workshop energetic, to involve the participants and to provide meaningful activities.

By employing the train-the-trainer strategy, the board has been able to offer a comprehensive professional development program. Topics of inservice sessions include cooperative learning, school-based management, classroom management, non-violent crisis intervention, student assessment and evaluation, and multiple models of schooling.

The programs are not limited to educators. Furlong points out that sessions will be offered on topics of concern to parents and students. A student leadership seminar will be offered to students from elementary school through to high school. In these sessions students will have the opportunity to build confidence and self-esteem, learn about group dynamics, and improve their listening and communication skills. Parents will also be encouraged to participate in training at the centre. The board hopes to provide parenting sessions on topics that include preparing a child for school and providing a sound study environment at home. Parents will also have an opportunity to keep up with computer technology— from DOS to the Internet.

The board has also developed a training partnership with the Durham Board of Education in Ontario and the Learning Consortium of Ontario, which is made up of the University of Toronto and the five largest school districts in that province. Through

this partnership, the Roman Catholic Board for Labrador, is able to share ideas and expertise on topics related to professional development in education.

Partnership building has played a significant role in establishing the PD centre in Labrador City and will continue to play a role in the programs that are offered. Furlong is pleased with the support and hopes that it will continue. "We have built strong partnerships through this project. We want parent councils to be involved as well as business and government," says Furlong. "It's important that the centre be dynamic. Good planning and communication between all partners will ensure that this PD centre will help meet the human resource development needs of the region for some time to come." Ω

Project Partners:

Roman Catholic School Board for Labrador

Iron Ore Company of Canada
Wabush Mines

United Steel Workers of America
The Churchill Falls Labrador

Corporation

Eric G. Lambert School

Labrador West Integrated
School Board

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Human Resource Development

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(RECYCLE, continued from page 18)
in reducing the amount of waste going to incinerators and landfills. Diverting waste through school 3R (Reduce, Reuse, Recycle) programs extends the life span of incinerators and landfills.

The January 1996 edition of the District Recycling Newsletter demonstrates the extent of the partnerships involved in this project, and the value of cooperation and participation to its success. "Students, teachers, school administrators, school custodians, parents, school board members, community members, businesses, government offices and facilities, town councils, organizations - a sincere thank you for your support and participation. Together we have made the district recycling depot a success story."

The District Environment Committee believes that the recycling depot is an excellent example of an education/business/community partnership and hopes that what they have accomplished in their communities will inspire others to cooperate in similar ventures elsewhere in the province. Ω

Len Pitcher has received the 1996 Environment Award in Education for this project and others. The award is given by the provincial Department of the Environment and administered by the Newfoundland and Labrador Women's Institutes.

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(COURSE, continued from page 21)

Graduates of this new program will be skilled technicians who are capable of selecting, installing, configuring, maintaining and repairing computer systems. As specialists in many aspects of computer technology, they will play a vital role in helping businesses maintain their competitiveness. Ω

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Revised applications and
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Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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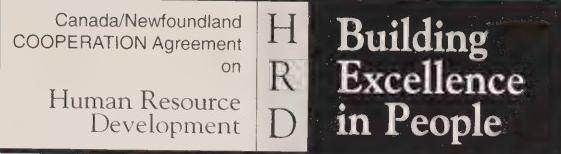
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Z O N E C O O P E R A T I O N



The COOPERATION Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the needs of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community and enterprise education, as well as provide programming for high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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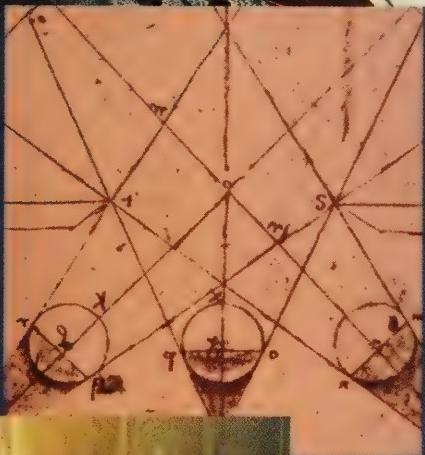
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The Journal of the Canada/Newfoundland
COOPERATION Agreement on Human Resource Development



Technology and
Human Resource
Development

Prospects

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The photographs of the Hubble Telescope and the Space Shuttle that appear on the cover are being used with the kind consent of NASA



Technology and Human Resource Development

The symbiotic relationship between technology and human resource development has been part of our existence since humanity's earliest days. Each generation has passed on its knowledge of increasingly complex technology to future generations. We have adapted our educational strategies to address social, economic and technological demands. We have learned that technology and human resource development will advance at an optimal rate if there is a balance to the very complex solution that governs their relationship.

The balance can be illustrated by the image of a tightrope walker. On the rope walker's pole is technology and human resource development. They are not opposites, but are two aspects of our nature that need to be balanced in order for us to advance. The walker represents humankind, our traditions, our institutions, and our cultures. When there is a balance, we progress along the rope at an optimal rate. But we always have to maintain some semblance of balance even to stay in a stationary position on the rope. Sometimes, a wobble will cause us to take a step backwards.

We are now at a point on the rope where our technology and our human resource development process-

es have become very complex. Finding a balanced solution that addresses concerns of social equity and economic necessity requires good planning and a cooperative effort from individuals in many sectors of our society.

This issue of *Prospects* explores some of the initiatives underway to find a balanced solution. The development of curriculum is a key issue. In "Technology Education in Newfoundland and Labrador Schools", Leon Cooper presents the new technology program for the K to 12 system. Barry LeDrew describes the partnership that has been established in the Atlantic provinces to review and develop a common core curriculum. In "The Changing Face of Education", we report on a round table on virtual learning hosted by Jaap Tuinman at Memorial University. At this round table educators, civil servants and private sector interests discussed how new communications technologies will affect our educational institutions, our students and our traditional human resource development practices. Other articles deal with how new practices are enhancing traditional education programs and encouraging the development of new programs.

In the midst of the images of

modern technology on our cover, we have included a drawing by Leonardo da Vinci. This image acts as a reminder, in the presence of our impressive modern technology, that creative genius has been around for a long time. Regardless of what technology we use to express ourselves, be it with charcoal and paper or by manipulating a flow of electrons, the process begins and the technology is created first in the very human environment that is our imagination.

Trudi Johnson
Albert Johnson
(editors)



The next issue of *Prospects* will deal with the cultural changes that are occurring in our educational institutions and our workplaces, and explores some of the forces that are driving them. Please send submissions on these or other topics relevant to human resource development to the editors at the address found on the last page. Your submissions will be carefully considered for publication.

DIRECTORY ASSISTANCE

Career Exploring and Planning via the Internet

accessing points of interest for school counsellors, career education teachers and parents

by
Phyllis Mullowney

A vast amount of career information is available for teachers, counsellors, students and parents alike via the internet. This article should be seen as a sampling of resources that are available and is by no means exhaustive. Sites can be found that offer resources for the three major stages of career development: self-awareness, career exploration, and career and educational planning. There are many ways students, teachers, counsellors and parents can make use of these resources. Take time to check out these sites.

The Occupational and Career Development Division, Ottawa, Internet site <http://www.globalx.net/ocd>, provides most of its career information in an electronic format. This information, designed for junior and senior high school, encourages students to think about their future by focusing on occupational possibilities

and assists teachers, counsellors and parents in understanding the changing labour market.

The Schoolnet Career Centre at http://www.schoolnet.ca/career_centre provides access to information for high school students in career and educational planning. A news group allows students, teachers, counsellors and parents the opportunity to interact with career experts in Canada.

CanWorkNet is a directory capable of connecting students, teachers, counsellors and parents to hundreds of sites across Canada. Information on career and educational planning are among some of the services offered at this site - <http://canworknet.ingenia.com/canworknet>.

School Finder <http://www.schoolfinder.com> is a web site designed to help students find the right post-secondary school. It includes information on Canadian colleges and uni-

versities.

Collegeview <http://www.collegeview.com> offers in-depth resources about admission procedures to colleges and universities in Canada and the United States. Information on financial aid and specific careers is also available.

The Real Game, developed by Bill Barry and Susan Wright in St. John's, Newfoundland, is a hands-on, practical career exploration program that brings real life to the junior high school classroom. Information on this resource may be accessed at <http://www.realgame.com>. Watch for further developments with this program.

The SCAN Website is an exciting one for counsellors, students, teachers and parents. Developed in this province by the School Counsellors' Association, it is the association's attempt to meet their members' need for current and relevant information to aid in the career exploration and planning process. This well-developed site provides links to current, up-to-date career information and post-secondary institutions (both locally and nationally). The Website <http://www.stemnet.nf.ca/Organizations/SCAN> is being maintained by Dave Bishop, school counsellor at Persalvic High School in Victoria, Newfoundland. Site suggestions are greatly welcomed!

Under development is NLWorkNet, an electronic work site that will enable provincial information to be collected and developed and made available through CanWorkNet. The Department of Development and Rural Renewal is (continued CAREERS on page 30)

Technology: A Term Denoting Many Meanings in Education

by
George Haché

The increased use of communication technology in school curriculum, K-12 and beyond, has certainly provided educators with a host of new challenges in recent years. Its introduction, usually denoted as introducing technology, has compelled educators to seek ways of acquiring new skills in the hope of enhancing their teaching practices. Moreover, students are attending technology related courses in growing numbers. The rate of growth and the sense of immediacy associated with the need to use technology in teaching, or teaching of technology, has also led to curriculum review and a study of technology to answer some fundamental questions. How can the technology best be utilized in schools, what constitutes tenable technology education, and what changes to traditional curricular practices need further consideration in the advent of introducing new curriculum that has a technology focus? In a context where the base of knowledge is under-

going constant change, there is a need to review these questions.

Since their introduction, the use of computers in schools has been understandably perceived as using technology. Perhaps this is because it was commonly referred to as "computer technology" and the word computer was frequently omitted from use in casual reference. Regardless, the use of computers in curriculum precipitated a number of curricular changes, some rather dubious. Initially an item of curiosity, computers were used by both industrial shop and science laboratory teachers in the early 1970s. They were additionally viewed as electronic devices useful to control lab experiments, as monitoring devices, and were connected to a variety of machine shop tools. Machine code was then the language of computers as there were no drive devices with which to easily retrieve or save programs. Some instructors became proficient in writing machine code while others started to teach



BASIC, a programming language used in the early desktop computer courses. Perceived as necessary knowledge for students to acquire, these activities soon became institutionalized as curriculum and offered in schools by the end of that decade.

With the introduction of storage devices, computers were quickly adopted by the business and technical world. This in turn led to further development of database, word processing and CAD (computer-assisted drafting) software. Not surprisingly, this level of computer technology was quickly adopted and augmented business education and drafting curriculum where the teachers who were vigilant of emerging curricular content could enhance business and industrial simulations. Early computer acquisitions for schools were rationalized with the goals that prevailed in such utilitarian courses. Teachers insisted that they were useful to assisting them in conveying realistic work-world perspectives. Later a growing

number of general education teachers recognized the advantage of using computer technology in their courses as well. They quickly rationalized their need for the technology with references to general education views and followed with a diverse collection of software, some general, other utilitarian in nature, to greatly swell the number of teachers who perceived a need to teach some of the technology in schools. But what of the terminology that was evolving during this period of time?

Technology education emerged from industrial arts as a curricular program that had a clear and distinct rationale for using computers to support that curriculum. Its period of change occurred simultaneously with the increased need for computers in other curricular areas. During this period of growth the use of terms such as technology in education, educational technology, computer technology, and others were also prominent, each emanating from necessary curricular activity. It all served to confuse educators.

Technology education was predicated on student development. It accomplished this with a utilitarian perspective of the work world, an experimental view of the science world, an adherence to practical hands-on approaches and lab activity, a strong curricular history in promoting design education and a career exploration emphasis. It continued its unique nature in the presence of expanding curricular use of computers in education, incorporating emerging technology in a manner as to not subvert its intended goals.

The investigative perspective inherent in effective technology education provides it with sound grounding if not highly sought out in times of rapid technological change. Benefiting from a close association with technological skill development,

broadly based technology education programs are being revitalized in Canadian schools. Reviews of technology education in Newfoundland and Labrador have resulted in a perspective that may lead to distributing increasing amounts of technological resources throughout the greater curriculum and may increase the number of educators who will share in the technological orientation of youth.

Perhaps the confusion resides in the lack of clarity about what constitutes a technology curriculum and the ease with which any technological phenomenon is construed as having

guration that would provide a solution to what constitutes an effective technology education for all youth?

- Is technology orientation desirable if it is spread throughout the curriculum or placed in a laboratory that houses only computers as a resource for learning modern technology content?
- Has the greater emphasis on acquiring computers overshadowed other resource acquisitions that are needed to promote an effective technology orientation for youth?

What is known about the technological education needs of youth?

some potential presence in school curricula. Or is it more related to the views of educators that acquire introductory capability with computers and wish to be viewed as technologically capable, then fashion their curricular offerings around technological events they understand?

It all gives rise to another series of questions.

- What is known about the technological education needs of youth?
- Can a balance be achieved between the appropriate selection of technological resources, appropriate laboratory design, and adequate level of curriculum development and inte-

In the swell of interest in technology education, and in light of recently released provincial guidelines for development of more technology in education, there is an opportunity to examine such questions critically. Check out some of the sites and compare them to what is being offered. Discussion related to these points is offered at the following:

- Definition for Technology Education...
<http://ed1.eng.ohio-state.edu/Default.html>
- Draft of Provincial Plan...
<http://www.stemnet.nf.ca/DeptEd/Program/teched/framework/toc.htm>
- Programme of Studies...
<http://www.stemnet.nf.ca/DeptEd/Program/prgmstudies/index.html>
- Under Journal...
<http://scholar.lib.vt.edu/ejournals/JTE/jte.html> Ω

Technology Education in Newfoundland and Labrador Schools



by
Leon Cooper

Technology has at least two components - it is a product as well as a process. The common perception is that it is a product - the tools and artifacts that we use daily. By definition it has always been much more. It is the means by which we develop solutions to needs and wants. Its most important aspect is the strategies and methodologies that we employ to develop those solutions. Those strategies deal with resource consumption and the consequences of technological activity. Technology Education is part of the K-12 school curriculum that develops students' knowledge of the theory and practice of technological problem-solving and their capacity to make sound technological choices.

Technology education curriculum in this province began almost 10 years ago with the efforts of the Industrial Arts Special Interest Council of the Newfoundland and Labrador Teachers' Association and an industrial arts committee from the Department of Education. Both groups realized that the industrial arts program, based as it was on industrial technology practices of decades earli-

er, was no longer serving the needs of students. The first two technology courses, based on product design and residential design practices, were introduced six years ago. Additional high school courses in communications and computer technology have since been added. In spite of the progress (or perhaps because of it), a debate has been continuing and it was only in June of this year that a curriculum framework for technology education was completed. The debate centered on two issues: the relationship of technology and science, and the relationship of technology education and technology integration. The debate included a draft framework for technology education and two major consultations.

The technology - science debate was concerned with the similarities and differences between technology and science and whether or not both could or should be delivered as independent subjects or through an integrated approach. The dominant argument was that they are sufficiently different to warrant different curricula.

Technology and science are inter-

Technological activity always results in new needs and wants that create new problems. It also affects social issues and is a major factor in determining the limits of personal choice.

related and mutually beneficial, but technology is not the same as science. They have different origins, serve different purposes, employ different methods, and have different outcomes. Modern technology depends heavily on a thorough understanding of scientific concepts and principles. Modern scientific practice cannot be conducted without employing sophisticated technological tools and processes.

Each has effects which are felt in both social and personal contexts. Science is concerned with the natural world; technology with the human made. Science has an investigative focus; technology has a practical problem-solving focus. Science proposes explanations of the natural world while technology offers solutions to human needs and wants. Both have consequences. Science raises new questions and opens new avenues of investigation, affects social issues and personal choices.

Technological activity always results in new needs and wants that create new problems. It also affects social issues and is a major factor in determining the limits of personal choice. Technological tools are essential to science education; however, its focus is on the practices and processes of science. The focus of technology education is on the tools, strategies and

processes for developing new technological products and services that directly resolve a problem.

The technology education - technology integration debate focused mainly on whether or not technology integration meant that technology education should be integrated across the curriculum. The conclusion was that both technology education and technology integration have some common elements, but are quite dissimilar. Technology education is a specific curriculum area concerned primarily with practices and procedures for developing technological solutions to problems. Technology integration is a very broad issue for education. It is driven mainly by the rapid evolution in computer and communications technologies and the recognition that education must deal with them in a meaningful way for students. Integrating these technologies into educational practices raises questions of equity of access, funding, skill sets for practitioners, communications practices, and learning outcomes development and accountability tracking.

- Classroom issues center on information and communications technologies as tools in the teaching and learning process. Issues include: common and discrete roles in each

discipline; location and number of tools; lesson planning; classroom management (e.g., scheduling, student/teacher roles in the learning/teaching process); and student assessment.

- School issues include: teacher and administration readiness and availability, and access to technology by teachers and students. Collaborative technology planning should consider classroom issues as well as community/student/parent needs to understand the issues and the technology.
- School district issues such as network protocols (who has access to whom), curriculum use, technology maintenance, staff professional development, and evaluation practices should be considered in district technology planning.
- Department of Education issues include curriculum development (e.g., developers' knowledge and use of technology, identification of appropriate technology for the curriculum), means of curriculum delivery (e.g., traditional, CD-ROM based, network-based, Internet), curriculum management, and learning resources management.

THE TECHNOLOGY EDUCATION PROGRAM

The technology education curriculum is built on six major outcomes. Examples of the purpose of each are described below:

1. The nature of technology is concerned with the role and purpose of technology as a means of human adaptation. Students develop understanding of:
 - technology as a modern endeavour
 - the evolution of technology
 - technology as a creative design and problem-solving process employing

- invention and intuition
- technology as a product - tools, machines, consumer goods, resource consumption
- relationships of technological activity to other disciplines and activities
- the role and impact of information and communications technology in all areas of modern technological practice.

2. Technological problem-solving is concerned with analysis of human needs and wants which may be met by technological activity. Students:

- identify, describe, formulate, reformulate, and analyze technological problems
- show creativity and initiative in applying the design process
- develop trouble shooting skills
- solve technological problems individually and collaboratively
- develop and use skills with tools and materials, including information and communications tools and techniques
- discover personal and creative ways to use tools and materials for aesthetic expression.

3. Technological impact is concerned with, for example, the role of technology as a powerful change agent. Students examine:

- technological outputs - the consequences of technological activity. They may be desirable and expected; desirable and unexpected; undesirable and expected; or undesirable and unexpected
- technology as a proactive/reactive personal, social, or environmental force
- the rationale and necessity of sustainable development; and the consequence of convergence of all communications technologies into

a single, multi-modal digital technology.

4. Technological literacy is concerned in large part with language, reading, and communications with and about technological concepts, products and issues. Students develop abilities with:

- technical vocabulary and concepts
- knowledge and understanding of technological, scientific and mathematical principles
- reading and writing technical material
- using communications networks effectively and efficiently
- logic and programming; and
- making informed decisions about technology.

5. Lifelong learning is concerned with the ability of students to become more effective and capable learners, and with development of curiosity and a desire to understand the role of technology. For example, students:

- examine technology - career links
- explore the technological future and its relationship to personal success, health and happiness
- work and learn by collaborating with others near and distant
- use communications technology to acquire, produce, assess, adapt, present and share ideas, information, and technological solutions.

6. Technological communications are concerned with students' understanding of how communications technologies and tools are used in control, production, energy/power, and biotechnology. Students examine ways in which communications technologies are used for:

- design of systems and processes

- development and application of communications devices and networks for a variety of technological endeavours
- development/production of systems, tools and devices
- management of processes and systems.

PROGRAM IMPLEMENTATION

The technology program implements these outcomes across five areas of curriculum focus: communications, control, production, power/energy, and biotechnology. The primary program (K-3) and the elementary program (4-6) will employ a series of thematic modules. They will integrate activities from all relevant subject areas. As with all grade levels, there is a design and technological problem-solving focus. The intermediate program (7-9) will have five major modules, one in each of the focus areas. The senior high program (10-12) will have discrete courses in design, communications, integrated technologies, production and computer technology (control).

Each will incorporate two or more areas of curriculum focus. Courses in design, communications and control have already been implemented. Current plans are to develop the intermediate program and two of the proposed new high school courses during this school year. Ω

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Atlantic Canada Common Curriculum Development

departments of education in the Atlantic provinces work together to renew curriculum for the K to 12 system

by
Barry LeDrew

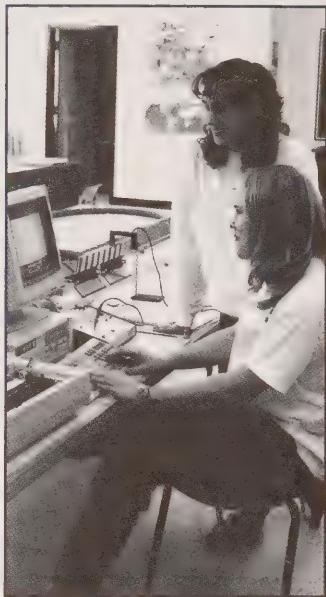
Departments of Education in the Atlantic provinces concur that the challenges facing their public school systems are strikingly similar. They agree that students' needs can be met if there are clearly articulated statements of what students are expected to know and be able to do by the time they graduate from high school and if the curriculum reflects these expectations.

In 1982, recognition of these similarities prompted the Maritime Premiers to establish the Maritime Provinces Education Foundation (MPEF). Reports and royal commissions conducted in each of the Atlantic Provinces fostered an agreement in 1994 to develop a common core curriculum for Atlantic Canada. The common core curriculum was conceived as a way to improve the quality, relevance and effectiveness of the curriculum in each province by combining expertise and input. It has been agreed that common curriculum development would take place in language arts, mathematics, science and social studies.

The primary purpose for collaborating in curriculum development is

to improve the quality of education. The Atlantic Ministers' decision in 1994 to embark on a common core curriculum and related projects represents a commitment to a regional agenda. As these regional efforts have progressed, Newfoundland and Labrador's level of participation has significantly increased. In 1995, the Newfoundland and Labrador Department of Education became a full member of the Foundation and the title was changed to the Atlantic Provinces Education Foundation (APEF).

The Ministers' decision to develop a common core curriculum for Atlantic Canada was not done in isolation. Also in 1994, interprovincial collaboration at the national level was strengthened by an announcement by the Council of Ministers of Education, Canada (CMEC) of an action plan that included the examination of curricular comparability and the feasibility of joint initiatives. This CMEC initiative has resulted in a pan-Canadian protocol for curricular collaboration. An outcomes framework for science education has been identified by the CMEC as the first



pan-Canadian project to be undertaken under this protocol. This project is currently in progress and the framework is scheduled to be completed by spring 1997.

The anglophone common core curriculum for Atlantic Canada will comprise developments in the areas of language arts, mathematics and science. The development of the common core curriculum will focus on results, referred to as outcomes.

Outcomes are concise descriptions of the knowledge, skills and attitudes that students are expected to demonstrate at graduation and at key stages in their education. They provide a consistent vision for the development of a rigorous and relevant core curriculum. The role of outcomes in curriculum development is outlined in a document produced by APEF entitled, "The Atlantic Canada Framework for Essential Graduation Learnings".

Following are the key features of the common curriculum development process:

- the development of a foundation document which will serve as the basis of all new curriculum development
- interprovincial project committees composed of provincial representatives (consultants and teachers) who provide input, reaction, and approval
- a lead province for each project responsible for drafting and revising specified curriculum in accordance with the direction and decisions of the regional project committee
- ongoing communication and consultation with appropriate stakeholders according to provincial practices
- projects developed by grade groupings - entry-Grade 3, Grades 4 - 6, Grades 7 - 9 and Grades 10 - 12
- articulation of outcomes and devel-

opment of curriculum guides for discrete subject areas.

SCIENCE CURRICULUM

The Atlantic Canada science project encompasses the development of a common outcomes-based curriculum for science, entry to grade 12, for the four Atlantic provinces. It involves the development of a foundation document and seven support documents or curriculum guides. "The Foundation for the Atlantic Canada Science Curriculum" outlines key stage curriculum outcomes (that is, outcomes for the end of grades three, six, nine and 12) which are based on eight general curriculum outcomes. Upon graduation from high school, as a result of participation in the science curriculum, the scientifically literate student will be expected to:

1. understand the nature of science and scientific knowledge, and the nature of technology
2. understand that science, technology, the environment and society are interrelated
3. use scientific knowledge, and cognitive and technical skills to investigate the natural world, to solve problems and to make informed decisions
4. communicate an understanding of the major concepts and principles of science and related technology
5. understand the interdependence of global social, economic, and ecological systems
6. demonstrate scientific attitudes and positive attitudes toward science and technology
7. develop habits of lifelong learning

8. demonstrate an awareness of careers in science and technology.

The more detailed specific curriculum outcomes, which identify what students are expected to know and be able to do at a specific grade level, are set out in seven curriculum guides:

- a primary science curriculum guide (grades 1 - 3)
- an elementary science curriculum guide (grades 4 - 6)
- an intermediate science curriculum guide (grades 7 - 9)
- a Grade 10 science curriculum guide
- a Biology curriculum guide (grades 11-12)
- a Chemistry curriculum guide (grades 11-12)
- a Physics curriculum guide (grades 11-12).

While these represent the areas where there will be common curriculum in the Atlantic provinces, there will be other courses, mainly at the senior high school level, which will be unique to individual provinces but will also be developed under the "Foundation for the Atlantic Canada Science Curriculum". For example, a new Geology 3203 course will be developed during the 1996-97 academic year for use in Newfoundland and Labrador schools. This course will be developed under the science framework described in the APEF science foundation document.

Newfoundland and Labrador has served as the lead province for the development of the foundation document, "The Foundation for the Atlantic Canada Science Curriculum". This document was developed during the 1994-95 academic year and validated during the 1995-96 academic year. This validation process provided for input from a

Newfoundland and Labrador also assumed the lead in the development of the entry-grade 6 science curriculum and the drafting of the curriculum guide.

broad base of educators and stakeholders by the circulation of a response guide with the document.

Newfoundland and Labrador also assumed the lead in the development of the entry-grade 6 science curriculum and the drafting of the curriculum guide. Prince Edward Island has drafted the guide for grades 7 - 9 and New Brunswick has drafted the grade 10 Science and Biology curriculum guides. Nova Scotia has prepared the Chemistry and Physics curriculum guides. In brief, the process for each project has common elements as follows:

- developing the specific curriculum outcomes, assessment strategies, and examples
- drafting the curriculum guides
- evaluating and recommending resources
- preparing documents for piloting
- revising documents based on feedback from the pilot process
- distributing final documents for implementation.

CURRENT STATUS

During the 1995-96 academic year the new science curriculum was field-tested province-wide in Newfoundland and Labrador at grades

1 through 4, and the grades 5 and 6 curriculum was piloted in 12 schools. The input from this process along with the input from the other provinces will enable the revision and refinement of the current draft curriculum guides in preparation for the implementation during 1997-98 and subsequent years.

The new science course for grade 10 or Level I (Science 1206) is also being piloted in 10 schools around the province. This course is scheduled for implementation in the 1997-98 school year. Science 1206 is a multidisciplinary course, that is, it draws its content from three of the science disciplines: biology, chemistry, and physics.

The intent is that the boundaries between these disciplines be somewhat blurred by focusing on STS (science-technology-society) issues and by emphasizing the nature of science. One of the ways this is done is by using a problem-solving or decision-making model to tackle issues with a scientific or technological focus. The advantages of such a course are that it will allow for more rigorous courses (greater breadth and depth) in biology, chemistry and physics; hence, a more challenging program for all students. It will help students make a

more informed choice of science course(s) for their senior high school program. Students will also have the advantage of an extra year of personal, social, and intellectual development and the knowledge and skills of Science 1206, which should increase their level of achievement in the biology, chemistry and physics courses. While it is not deemed mandatory, Science 1206 is highly recommended for all students leaving grade 9 because it deals with concepts which are fundamental to the courses in biology, chemistry and physics.

The first course of the new APEF Chemistry program (Chemistry 2202) was introduced during the 1995-96 school year and the second course (Chemistry 3202) is being implemented this year. This Chemistry curriculum is also being offered through distance education to 32 schools in the rural areas of the province.

Other science courses and programs developed under the APEF agreement will be implemented in this province as current courses are phased out in the normal cycle of curriculum development. Ω

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The Changing Face of Education

a round table on virtual learning

by
Albert Johnson

The widespread use of computers, the integration of communications technology into our culture and the World-Wide-Web (WWW) are changing the way many of us work and communicate. These new technologies offer great potential for the delivery of educational services. But this potential also offers challenges for human resource development professionals in all sectors of the economy. A round table on virtual learning was held in the G.A. Hickman Building at Memorial University of Newfoundland in August 1996. Jaap Tuinman, Vice-President (Academic), of Memorial University, brought together educators, civil servants, and private sector interests to discuss the potential of these new technologies, to identify the challenges and to consider the evolution of the learning institutions in light of these developments. The meeting was sponsored by STEM~Net, whose Board of Directors is chaired by Dr. Tuinman. Harvey Weir is its Executive Director. Technical support for the event was

provided by staff from Telemedicine and personnel from the Division of Educational Technology videotaped the proceedings.

The two-day round table was divided into two sessions. Session one was entitled "Links and Anchors for Virtual Learning" and session two, "Linking Educators, Developers and Marketers for Virtual Learning". Each session opened with four speakers who presented views and information on various aspects of the designated theme. On both days a lively discussion followed the presentations.

SESSION ONE

The theme speaker on the first day was Andrew Bjerring, President and Chief Executive Officer of the Canadian Network for the Advancement of Research, Industry and Education (CANARIE). This private sector led, not-for-profit-consortium of 140 members was established in 1990 to facilitate the development of Canada's communications infrastructure and networks (CA* Net), and stimulate next generation



Frank Marsh from the Department of Education, Chris Labaty from Human Resource Development Canada, and Don McNeil from Bell Canada were among the participants at the round table.

products, applications and services.

Bjerring's opening remarks directed the participants to consider the paradigm shift that is affecting society as a whole. He pointed out that it is no longer sufficient to merely discuss technology. Educators must also understand the implications, potential and limitations of technology.

Changes are occurring in our learning culture and in the role of our educational institutions. Bjerring indicated that as our economy evolves from an industrial to a knowledge-based economy, the role of government is changing as are the needs of the population. Educational institutions are under pressure to change as well. From government, educators are pressured to improve access, increase the diversity of students and educators, work with industry and be more cost-effective. Industry is anxious that the education system meet real world needs, provide more "just-in-time" training and increase technology training. Students want universities and colleges to provide more options for learning, recognize student diversity, serve their learning needs throughout their careers and be more

open to change. Bjerring also noted that the competitive nature of the marketplace means that post-secondary institutions have to be better than the alternatives, both public and private, regionally, nationally and globally.

Because of these pressures, Bjerring believes there is a changing educational emphasis. Educators have shifted from practices that focus on the learning of facts to strategies that encourage the development of skills in problem-solving, team-building and lifelong learning. In this new paradigm, continuous improvement is as important as obtaining an acceptable grade, interdisciplinary knowledge is as important as a program structured around specific courses, and interacting with and processing information is as important as absorbing it.

Bjerring points out that there are many indications that technology is an integral part of the new learning process. Students are getting better access to network resources and several Canadian initiatives are experimenting with various methods of distance delivery. Partnerships are being formed with industry, new administra-

tive systems are being utilized in universities and colleges, and there is a growing appreciation for the strategic nature of information technology.

Acceptance of this new emphasis is not universal. There are concerns of balancing the role of university to provide a liberal arts education as opposed to providing training in various professions. But Bjerring believes that the pressure of competition from over 800 university course offerings already on the WWW will encourage Canadian universities to adjust the balance. Post-secondary institutions in concert with other public institutions and, where appropriate, private sector associations, can provide internationally competitive learning resources to individuals and organizations globally.

Bjerring argued that Canadian institutions have a competitive advantage. The programs at the country's universities and colleges are sound and are well-respected. They also have a good tradition of collaboration with peer institutions and industry. To further ensure this advantage, Bjerring suggested that Canadian learning institutions need to build faculty resources and improve faculty technology skill levels, encourage experimentation, form more partnerships with industry, and analyze their competitive advantage.

Bjerring summarized his presentation in four key concepts:

- we are in the middle of a broad-based paradigm shift that is affecting the role of learning institutions in society and in the economy
- technology is among the drivers of the change and offers a possible and partial response to it
- response should include the development of partnerships and the exploration of new models of service delivery

- we must be guided by the needs of the client.

Frank Davis, President and Chief Executive Officer of Operation ONLINE (Opportunities for Newfoundland and Labrador in the New Economy), was the second presenter. Operation ONLINE was created to provide leadership and investment in information technology as a catalyst for economic renewal and growth in Newfoundland and Labrador.

Davis provided insight into the Newfoundland and Labrador experience and outlined some of the challenges that face the industry. During the last ten years the province has made significant advances with the communications infrastructure and in the use of technology. Davis indicated that the number of television channels had increased substantially, 85% of the province's households have at least one VCR and 35,000 homes have a personal computer. Internet access has grown from virtually non-existent to over 10,000 public educators with access through STEM~Net and thousands more with access through public institutions and private companies. Communications services have improved significantly and Davis reported that the fibre optic presence in Newfoundland and Labrador has increased significantly and service will continue to improve. New investment planned over the next five years will see more than \$500 million spent on improvements to the province's communications infrastructure.

These factors indicate that the information technology and high technology industries in the province are well positioned to take advantage of new opportunities. However, Davis pointed out challenges that educators need to consider. Businesses in the information technology sector have

identified gaps in the skills of graduates of post-secondary institutions in the areas of information technology financing, marketing, and human resource development management. The industry is eager to form partnerships with the universities and colleges to fill these gaps.

David Porter, of the Open Learning Agency, was the third speaker of the first session. The Open Learning Agency is a publicly funded institution in British Columbia that offers high school, university, college and workplace courses and training programs, and is an accredited university. The programs are offered via distance delivery systems that include the WWW and television broadcast. Porter offered a brief history of the development of the organization and emphasized the need for institutions to compete in what is rapidly becoming a very competitive marketplace. He indicated that marketing is a very important aspect of the process but the primary strategy of the agency is to take good content and use it effectively in the new environment of the WWW.

Erin Keough, director of the Open Learning and Information Network (OLIN), was the final speaker of the first session. OLIN is a consortium of Newfoundland and Labrador public and private sector organizations involved in the delivery of information and learning programs. Keough provided an overview of OLIN and outlined some of the major issues that face the consortium. These include quality and content of course offerings, network and technology issues, and financing. Keough pointed out that to achieve the best use of resources, organizations have to cooperate, share connectivity and community locations where it is practical to do so. This can be achieved by establishing Learning and Resource Centres (LARC) in communities

throughout the province. These centres would contain as many of the partner services as possible. Moving these services to one location would provide a focal point for human resource development activities in the community. Keough indicated that it is important to build on the strengths of the partners and act as the technology infrastructure becomes available. A key concern of OLIN is equity of access and Keough ended her presentation with, "A challenge to us all is to make rural access a reality."

SESSION ONE - DISCUSSION

The discussion that followed was intense and indicative of the struggle that educators face as they attempt to deal with new technology. The issue of rural access in Newfoundland and Labrador presents serious economic hurdles but these hurdles can be overcome to achieve equitable access. Issues dealing with course content, and the skill levels of professionals already in practice in health care and education were discussed. Concerns were raised about the speed at which institutions should react. Questions of balance were considered: quality of content versus affordability, competition versus cooperation, and risk versus reward. Wilf Bussey, Director of Computing and Communications at Memorial University, summarized the comments of the listening committee: "We have the making of a grand challenge in the educational environment to be more relevant, to respond in a competitive environment and to collaborate."

SESSION TWO

The second day of the round table was devoted to the theme of "Linking Educators, Developers and Marketers for Virtual Learning". Rory McGreal from Teleducation, a publicly funded initiative in New Brunswick, opened the second session

by emphasizing the importance of the education sector in the economy. McGreal reported that one-quarter of Canada's population is enroled in full-time education or training and that 30% to 40% of the country's economic activity involves learning and training. He went on to predict that by the year 2000 half of Canada's economy will be based in the learning and training sector.

Competitive advantage was an important theme at the round table and McGreal focused the next segment of his presentation on the advantages that have been nurtured in his province. McGreal claimed that New Brunswick is the only province in the country that can offer a 100% digital communications service. The demographic profile of the area shows a good mix of urban and rural areas. The province has two official languages, public/private sector cooperation, and can move quickly on initiatives.

Distance delivery services in New Brunswick are moving to the WWW. Information already available through this medium in the province include a manual on web learning which also provides teachers with strategies on how to take advantage of the new environment. Plans to increase their presence on the WWW are in motion. The proposed virtual campus will provide universal access to university courses and training. The new agency will include divisions devoted to content, service delivery, research and development and marketing. McGreal believes that this new initiative is not just a distance delivery system but will be used as a way of reforming the institutions within the province. Infrastructure is being developed in New Brunswick schools so they can take advantage of the web environment. Multimedia centres are being put in place at the province's universities to encourage the use and development of multimedia resources.

The second speaker for the session was Gary Popowich of Distance Education, Alberta. Popowich focused his presentation on issues concerning the production of multimedia resources. After describing initiatives currently underway to develop multimedia resources for mathematics, physics and chemistry at the high school

level, he directed his comments to the unique characteristics of multimedia development. This development can be conducted in-house, contracted out to private sector developers or produced through collaborative initiatives. The process is driven by the curriculum and the first concerns to be addressed when implementing a multimedia strategy are technology standards and protocols.

Popowich believes the resources must have a sound pedagogical basis. Instructional design is a key factor in the production of good multimedia material. Interprovincial partnerships have been formed between various departments of education and learning institutions to develop resources. These prototypes have been expensive to produce. The high cost of development is restrictive to many companies in the private sector except for the larger publishers. Another problem associated with the cost factor is that the information presented in these resources may need to be updated regularly. As high speed access to the WWW becomes a reality in more areas, Popowich believes that multimedia resources will move from the compact disc format to a web-based format.

Jack Botsford, Executive Director of the Newfoundland Alliance of Technical Industries (NATI), was the next speaker. Botsford also dealt with issues concerning multimedia production but from the perspective of the private sector. He indicated that success in this area depends greatly on the quality of the

product. Characteristically, quality multimedia resources demonstrate good instructional design techniques and are often produced by teams of developers led by graphic designers. He described the industry in the rest of Canada as being in a state of flux as they decide how quickly to move to a web-based format.

Botsford believes that the Newfoundland and Labrador industry has its share of strengths in the areas of software development and instructional design. He also indicated that businesses are interested in forming new partnerships to implement good ideas and he is eager for NATI to act as a facilitator for partnership development.

Janet Carter of Bridgeway International, a manage-

Corporate and workplace training is an area that offers good partnership opportunities for public and private sector organizations involved in human resource development.

ment consulting firm based in St. John's, Newfoundland, was the final speaker of the second session. Carter directed the participants' attention to the issue of forming private and public sector partnerships. She pointed out that the concerns of small and medium size businesses are different from those that confront large educational, public sector interests.

Businesses in this sector are operating in a highly competitive marketplace where the company with the best content wins. These businesses have to be client-focused and learner-driven, and are concerned with meeting payroll and with cash flow, profitability, and questions of ownership and copyright. They have to balance risk and reward. While academic institutions are often concerned with pure research, have sound reputations based on many years of tradition, deal in cost recovery and have a solid educational market, businesses in the industry are interested in applying research, being flexible, generating profit and surviving in the private sector market.

Carter does believe, however, that common ground exists. Corporate and workplace training is an area that offers good partnership opportunities for public and private sector organizations involved in human resource development. Development of internationally competitive learning services is possible if there is a global focus, the needs of the client are addressed and partnerships that take advantage of each partner's strengths are utilized.

SESSION TWO - DISCUSSION

The discussion that followed the presentations was again lively. Educators dealing with issues in the K to 12 system were concerned about how the integration of technology into the curriculum was going to occur given the limited high-tech

resources in some schools.

Participants discussed issues concerning the type of learner that is graduating from our educational institutions. The marketplace requires self-motivated learners and discussion focused on how new technology would help students develop the learning skills required to work in a dynamic, high-tech economy. The issue of competition in the educational market was discussed. Some participants warned that students were going to seek courses from other institutions via the WWW. Others argued that attending university and interacting with students and professors in a classroom were experiences that held their own learning potential and could not be replaced by online course offerings. These same individuals were eager, however, to enhance these experiences with multimedia resources, online interaction and other strategies offered by new technology. Some participants cited examples where online resources were already being used effectively in regular classroom settings.

Further discussion focused on issues such as provincial policies dealing with granting credit for online courses, marketing, teacher-directed versus student-directed approaches, and the importance of balancing skills, attitude and knowledge in the learner. Nancy Parsons Heath, assistant director of STEM~Net, in her summary, highlighted many issues raised by the presenters and in the group discussion. Included in her remarks were reminders that educational institutions are integrating many different technologies into learning strategies and are not just relying on online delivery alone, and the importance of maintaining a human rather than just a technological focus.

Jaap Tuinman chaired both sessions of the round table and in his

conclusion highlighted four points dealing with the implementation of technology in the education sector:

- technology is ahead of learning instructional applications and always has been
- the new technology presents information in malleable bits. This allows for constant instructional redesign which is an educational plus of incredible magnitude if institutions take advantage of it.
- learning institutions are still all doing the same thing, developing the same courses in the same way
- organizational and cultural blockages are making the application of technology to learning difficult.

The round table on virtual learning gave educators, civil servants and private sector interests involved in the development and delivery of educational services an opportunity to debate the issues that are driving significant changes to our educational institutions. These issues are ever present and the need to cope with them has human resource development professionals eager to continue this type of interaction. The second round table on virtual learning will be held on November 8, 1996 where this dialogue will continue. Ω

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Laboratories and New Technologies in Education: The Memorial University of Newfoundland Experience

by
George Haché

Effective delivery of Technology Education programs has been the main focus of the newest facility developed in the Faculty of Education at Memorial University of Newfoundland. In a *Prospects* article (<http://www.stemnet.nf.ca/Community/Prospects/v3n1/tetp21c.htm>) entitled, "Technology Education Teacher Preparation for the 21st Century", Dennis Sharpe (1996) provided a description of the new laboratory facility aimed at enhancing teacher development using the latest technology.

In his article Sharpe described the rationale and procedures that were considered to conceptualize and build the new laboratory. A need existed to support the diploma program for technology education with a refurbished facility to replace two older laboratories that were deemed restrictive in space and inventory, and not conducive to teaching vital programs. As well, the former practice of using facilities located in area schools and elsewhere on the Memorial

University campus had not always provided the optimum setting with which to experience the latest curricular changes in this growing area of study. This became a critical issue as new guidelines for Technology Education had emerged to add immediacy to a need for a new setting that would gather the latest technology identified in provincial documents. This article reports the nature of the activity that transpired during the initial start-up cycle of courses offered in the new facility during the summer of 1996.

CHALLENGES

As the needs for a program of Technology Education for provincial schools had changed, the challenge became one of providing a current setting where instruction in new technology could respond to its associated challenge to change. A series of documents released by the Department of Education provided the description of the emerging programs of studies and identified a

renewed emphasis in Technology Education. "A Curriculum Framework for Technology Education: Living in A Technological Society" (<http://www.stemnet.nf.ca/DeptEd/Program/teched/framework/index.html>), the Program of Studies (<http://www.stemnet.nf.ca/DeptEd/Program/prgmstudies/index.html>) and Technology in Learning Environments or TILE (<http://www.stemnet.nf.ca/DeptEd/Program/tile.html>) described the newest changes about to occur in provincial schools.

To more adequately support the evolving teacher development needs with new technology required in the new school curricula, it was decided to develop a technology/science laboratory as a test-bed for further teacher development, without avoiding the real curricular challenges facing teachers in provincial public schools. Among the challenges was a need for the infusion of technology in a refurbished teacher development program, one that would enable each to effectively develop ways of implementing the new curriculum. A perspective was needed regarding:

1. how to organize technology education
2. how to create a test-bed for activity that could respond to various ability level groups of students
3. how to teach technology during times of restrictive budgets
4. how to reflect on the changing curriculum base of technology
5. how offerings at the K - 12 level can serve as an impetus for change

Initially the principal challenge was to provide individuals enroled in the program with a setting that was

equipped with the latest technological implements. The presence of a new facility would catalyze development. It would provide a point of centrality where there is a convergence of a number of curricula areas such as science and technology. It would foster suggestions for curriculum upgrade and partnerships in program improvement. Once the summer program commenced, the challenge

Among the challenges was a need for infusion of technology in a refurbished teacher development program, one that would enable each to effectively develop ways of implementing the new curriculum.

was one of establishing within that facility the means with which each participant could acquire new technological skills, develop teaching capability, challenge new curriculum perspectives, experiment with new procedures, build prototype solutions, and review issues related to the technological education needs of students enroled in provincial public schools. The catalyst effect appeared to have worked.

IMPLEMENTATION

Commissioning activity for a laboratory to make it more workable in the context of individual teacher needs and advancing technological capability required attention to a number of details. The first and most dramatic was related to the philosophical basis for the program, in particular the rationale used to combine related but different curricula subject areas into one geographical location. Technology Education (linked to former Industrial Arts) and Physics relinquished old settings that provided the real estate for the new facility. Accordingly, careful deliberations were required to adequately identify the laboratory apparatus needed for these two programs separately. Then, the requirements for the courses were compared for equipment that could be shared. The resultant discussion provided the basis for a new laboratory setting and a list of acquisitions was compiled. This has proven to be not only useful as a multi-disciplinary setting, but also responsive to expanding the scope of multi-disciplinarity, a potential not yet fully exercised in the faculty, largely owing to the newness of the facility itself.

Acknowledging the recommended revision to the former industrial arts program that was founded in industry but influenced by the presence of a readily accessible new laboratory setting, an ongoing challenge was how to keep the program design sufficiently flexible to maintain a coherent multi-year program structure yet still foster growth. This presented a unique challenge for the instructors. They sought to maintain some fidelity to the goals of the older program while responding to the needs of a rather eclectic group of teachers who were enroled and seeking both old and new orientations. Teachers from all grade levels and curricular areas were represented. It followed logically



Students work with equipment in the new technology laboratory.

that a wide diversity of activity transpired during the initial start-up cycle largely to reflect both the diversity of teaching expertise drawn to the program and of the individuals and the needs each participant had beyond the established core curriculum.

Within the discussion of a multi-functioning or multi-disciplinary potential, a number of issues were brought to the forefront. These included sharing of expensive resources, constraints in relation to the time required to adequately conduct technology programs, the emerging and changing technology culture, and a host of new challenges related to information access, retrieval and usage.

Each participant was placed into hands-on activity instruction and orientation. Not only were they immersed into curriculum procedures that were being proposed for the provincial schools, they had a chance to review the old standards that needed to be retained. Situations where laboratory configuration imposed a restriction to change in curriculum were reviewed. The challenges related

to the nuts and bolts of running a technological facility added yet another dimension of knowledge. This included details such as table widths, keyboard access, and space between work areas for free and uninhibited movement. As well, increased activity on the WWW required attention to presentation, access and design considerations that affect ethics and etiquette.

Maintaining and expanding the logistics of running the laboratory included attention to staffing, technical assistance, blending into existing operations, networking to satisfy both the need to oversee and control from a central location while offering clients their own experience in networking. New knowledge of how to operate the latest software and new hardware provided a collection of intense laboratory activities. The faculty was introduced to new apparatus which included: robotic devices, hydraulic and pneumatic controllers, advanced electronic interface to couple CPUs to a host of mechanical devices, video cameras, quickcams, infrared transmitting devices, satellite

devices, editing suites, and faster CPUs.

FINDINGS

There was ample evidence of fertile ground to initiate a follow-up and access feedback from participants with the view of improving future programs. The data that has been collected to date has been offered voluntarily in the form of verbal and written communications. More formal means of accessing participant reaction are presently in the design stages. The findings, however, initially indicate that beyond the acceptance of the underlying philosophy for the development of the program, other determinants need further consideration. These include a host of logistical matters such as:

- the diversity of laboratory activities
- the staffing required to offer the full complement of courses in the diploma program
- further development of communications networks in the province that can be used to augment laboratory experiences for technology teachers
- budget readjustment to incorporate the new facility into the on-going practices of a school
- timetabling of all individuals involved
- establishing a means of control to ensure that matters such as on-going maintenance, security, upgrades to maintain technological relevance, and necessity of public awareness for such a program is essential.

Deployment of the curriculum continued throughout the summer providing each participant with new challenges daily. Involvement meant participation in developing, dis-(continued **LABORATORY** on page 24)

Project Profile

A Fisheries Institute for Secondary School Science Teachers

In the summer of 1996, a fisheries institute provided teachers in the Newfoundland and Labrador school system with the opportunity to learn about ocean ecology and its relationship to fishery issues. The goal was to place them in a better position to teach students the complexities of the fishing industry and encourage them to find innovative solutions to problems now facing the fisheries.

The one week institute introduced high school teachers to fisheries and marine sciences. The institute was offered in the classroom and laboratory facilities at the Provincial College campus in Clarenville and at sea aboard the Marine Institute vessel M.V. Mares. The program dealt with topics such as:

- the ocean environment and marine ecosystems
- fisheries science and management
- survey and sampling techniques
- fishing gear and responsible fishing methods
- conservation and the future of the fishery

The project was modelled on similar initiatives in Nova Scotia and Maine. It is the intention of the Marine Institute to work with the Department of Education, Memorial

University, the Provincial College and the Newfoundland and Labrador Teachers' Association to make this teacher institute an annual event.

Evaluation of the project was conducted under two themes. The first involved the assessment of the relevance of the information and the second was to assess the degree to which the institute complements school curriculum, particularly the high school course, Biology 3201. Jan Negrijn, the instructor for the institute, was pleased with the response of

the eight teachers who participated. The teachers are eager to share this experience with their students and one teacher has arranged for a class of physics students to go out on the research vessel and study the physics of wave motion.Ω

Project Partners:

Fisheries and Marine Institute

Memorial University of Newfoundland

The Provincial College Newfoundland and Labrador

Teachers' Association

COOPERATION Agreement on Human Resource Development

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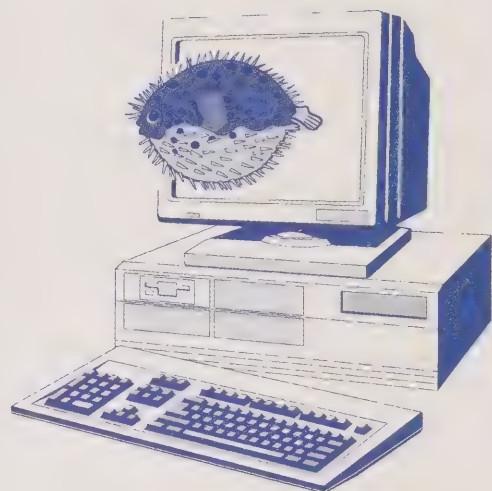
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Teachers participating in activities aboard the research vessel

Using the Internet to Develop an Awareness of Marine Issues within Schools



The Marine Institute, in partnership with STEM~Net and Canada's SchoolNet, is expanding current information links within the school system to give students and teachers information on the fisheries and marine sectors. The Marine Institute will develop electronic information services through contributions from various parts of the institute. Elementary and secondary schools will have access to the site and links to other fisheries and marine resources on the internet through STEM~Net.

Through this World-Wide-Web site, the Marine Institute will provide valuable information on the fishery, conservation, seafood development, the environment, and other marine industries. It will employ its existing capabilities to generate information directly applicable to the school system.

The Institute will also seek to provide information suitable for grades 4, 5 and 6 students to encourage interest in science and technology. The Institute currently offers mini enrichment courses to children enroled in grades 7, 8 and 9. This project will allow more opportunities to be pursued. Furthermore, an oppor-

tunity will be available for students and teachers to access Marine Institute expertise in problem-solving and analysis. Examples of topics are:

- fisheries issues
- development in marine and satellite communications
- innovations in the fishery
- navigation (planetarium via internet)
- general science and technology issues
- aquaculture
- marine environment
- fisheries and marine-related careers.

The development of current information on marine industries will allow the Marine Institute to become a valuable resource to the Newfoundland and Labrador school system. Students will have access to the most current innovations and developments in marine industries. Information to enrich school activities, such as science fairs, could also be made available. The current publication, "Marine Science", will be available on the Internet.

This project will enhance students' knowledge of marine industries and produce graduates with better

problem-solving and independent study skills, an improved knowledge of marine science, and an entrepreneurial attitude towards marine industries.

The enrichment of a Marine Institute WWW server to include relevant materials and linkages accessed through STEM~Net will be accomplished by a project coordinator who will develop and structure the Institute homepage, coordinate Institute activities and train others in the preparation of materials for access by the Web. Peter Fisher, Director of Instructional Development and Student Services at the Marine Institute, is pleased with the progress of the project. "The homepage is available at <http://www.ifmt.nf.ca/minet.htm> and materials are being developed for the web site," says Fisher. Local schools are participating in the development of the content for the site. Fisher appreciates suggestions and urges others to participate as well.

Evaluation of this project will be conducted under two themes. The first is to assess the usage of resources and the second is to assess the relevance of resources. The ultimate success of this initiative will be that the (continued INTERNET on page 28)



Memorial University's Graduate Program in Environmental Engineering

by
Trudi Johnson

In 1994, Memorial University responded to a request from Newfoundland and Labrador environmental industry to establish a degree program in Environmental Engineering and Applied Science. The proposal for a new graduate program was developed by Jim Sharp, Associate Dean for Graduate Studies, Faculty of Engineering. Fred Curtis, a professor in the program, was asked to devise a curriculum of study and an advisory board was established to maintain the link between the university and local Newfoundland and Labrador industry. Since its inception, the new program in Environmental Engineering and Applied Science has added greatly to the engineering program at the university.

The Faculty of Engineering and Applied Science began offering engineering degree programs in 1969 - 1970. The Faculty currently provides instruction in civil, mechanical and naval architectural engineering at the

undergraduate and graduate levels. Between 180 and 200 students enter the engineering program each year.

The new graduate program addresses the needs of professional engineers and scientists practising in Newfoundland and Labrador and will develop a pool of expertise in areas relating to the environment. Fifteen students are expected to graduate by December 1996. There are 42 part-time and full-time students enrolled in the program this year.

Two professors currently teach the new program, Fred Curtis and Tahir Husain. Sesh Seshadri, Dean of the Faculty of Engineering, is proud of the valuable expertise they bring to the program. "We went looking for professors with the knowledge and experience of integrating engineering, and environmental studies and science. Professor Curtis provides a perspective on environmental management while Dr. Husain adds an international perspective."

- Master of Science (Environmental Science) (M.Sc.)

The program is available on a full-time or part-time basis and is the only Canadian program where students can complete the requirements for the degree in one year.

Students who wish to apply to the program must have a background in Engineering or Science. Admission is limited and competitive. To be considered for admission, applicants should hold a Bachelor's degree in Engineering or an Honours degree in Science with at least a B average, or equivalent, from an institution recognized by the university. Students should have qualifications and/or environmental experience acceptable to the Dean of Graduate Studies and the appropriate Board of Studies.

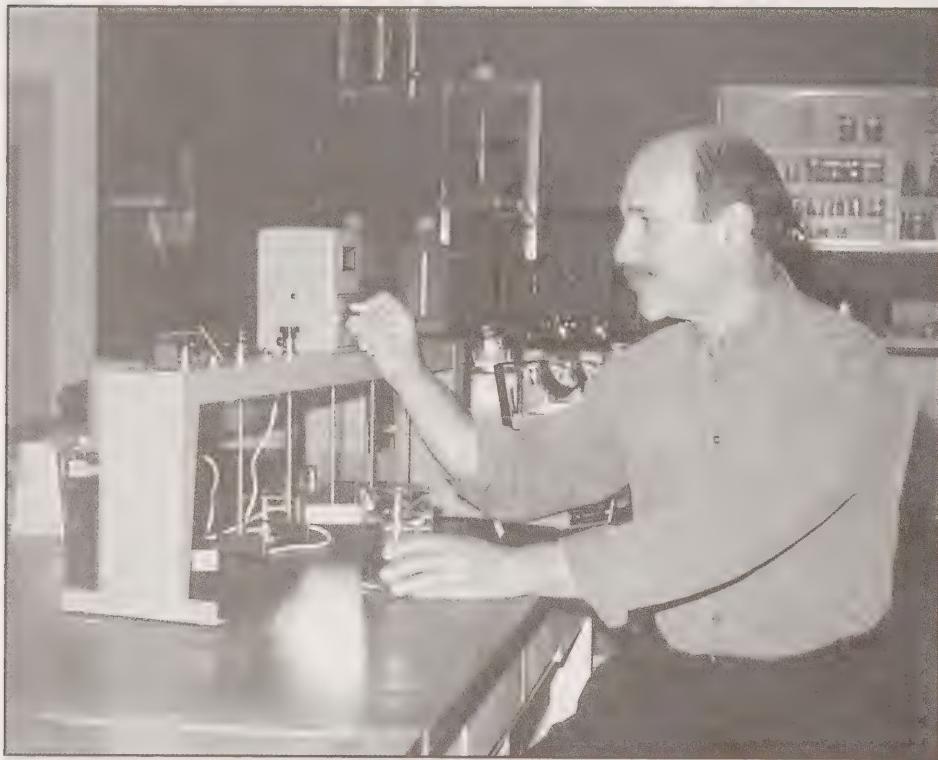
Science graduate students and the Environmental Engineering students begin their programs with a common course, "Environmental Science and Technology" which explores global and local environmental problems.

In addition to the required course, students select three courses from the following six:

- Earth and Ocean Systems
- Environmental Chemistry and Toxicology
- Applied Ecology
- Environmental Pollution and Mitigation
- Environmental Sampling and Pollutant Analysis
- Environmental Law and Management

The first three courses are offered by the Faculty of Science and the remaining three by the Faculty of Engineering.

The course on Earth and Ocean Systems includes a study of the forma-



Fred Curtis tests equipment in the new environmental laboratory.

Prospective applicants include recently graduated civil and mechanical engineers, natural scientists and professional engineers who desire upgrading. Students may enrol in the program on a full-time basis for one year or part time for two to three years.

The graduate program targets four sources of potential students. One group includes new graduates who wish to gain environmental expertise and complete a Master's degree before seeking full-time work. Another group comprises practising professionals who prefer to study part time and complete the program over two years by taking evening courses. A third group encompasses practising professionals who are prepared to take one year away from work to complete the degree on a full-time basis. The courses are also available to those interested and qualified people who wish to study a variety of subjects without necessarily registering for the full program.

With funding from the COOPERATION Agreement on Human Resource Development, a new Environmental Laboratory has been established and is scheduled to open in January 1997. The laboratory will complement course work and will provide students with "hands-on" experience in environmental engineering, particularly in areas such as air pollution, water contamination and soil contamination.

PROGRAM OF STUDY

The Faculty of Engineering and Applied Science and the Faculty of Science jointly offer a program in Environmental Engineering, Science and Applied Science leading to one of three degrees. These are:

- Master of Applied Science in Environmental Engineering and Applied Science (M.A.Sc.)
- Master of Environmental Science

tion and evolution of the Earth's "spheres"; climate forcing and climate change; sea-level change; global mass and energy balance; physical geography of terrestrial systems; biogeochemical cycles on land; physics of oceanic processes, and the biogeochemical cycling in oceanic environments. Environmental Chemistry and Toxicology gives an overview of the important chemical aspects and concepts in solution chemistry, chemical equilibria and organic chemistry. The course, Applied Ecology, explores issues in Environmental Biology from an ecological perspective.

The course, Environmental Pollution and Mitigation, examines the principles and concepts of ecology: air quality, noise, water quality, solid and liquid waste, and hazardous waste assessment. Course work in Environmental Sampling and Pollutant Analysis includes environmental sampling methods, storage and preservation of environmental samples, theoretical and laboratory analysis of water, sediment, soil, solids, liquids and sludges, as well as the statistical analysis of data. In Environmental Law and Management, students are introduced to environmental legislation, policies and regulations; permitting, licensing and approval of applications; inspections, investigations and liabilities; and corporate environmental management strategies.

Three additional courses are elected from the following courses offered in the Faculty of Engineering:

- Advanced Waste Water Treatment
- Solid Waste Management
- Hazardous Waste and Site Remediation
- Soil Contaminant Interaction
- Environmental Risk Assessment
- Environmental Assessment
- Air Quality Monitoring (to be added in 1997).

Remaining course requirements are completed from the courses listed above and relevant engineering, science and arts courses.

Graduates of this program can expect to have several employment options. Apart from the traditional environmental engineering positions, students are also qualified for positions in the social sciences, such as environmental teachers, administrators and regulators. In the wake of recent government downsizing in

three project teams, each with specific assigned tasks. The result was a comprehensive study that benefits three local communities. The research was conducted from May to August 1996 and the findings released to the communities.

The project was designed to integrate environmental management and engineering knowledge, training and skills by involving students in an interdisciplinary project. It had four components:

1. A background study of each community including population growth, tax base, current sewage infrastructure, cost of repair and maintenance, land use plans, STP operations.
2. A technology assessment of the existing system and alternative systems. Students were required to research and study alternative innovative waste water treatment technologies and sludge handling systems based on a number of parameters.
3. Students were required to employ an alternative evaluation method to recommend a preferred operation for waste water treatment. This evaluation would include socio-economic, technical and environmental considerations. In addition, they were required to undertake a preliminary layout design of the recommended alternative system and calculate capital and operational costs.
4. Students completed the project by examining the costs and benefits and the institutional arrangements of operating the sewage system as a private utility.

Students suggested that the best response to the sewage treatment

As the public becomes more environmentally aware, there will be a greater need for expertise in the area of the environment.

Environment Canada, graduates will more likely turn to the private sector for employment. As the public becomes more environmentally aware, there will be a greater need for expertise in the area of the environment.

In August 1996, the first graduates completed a group project which is topical and beneficial to the local community. The project is entitled "Waste Water Treatment Technology Alternatives for the Cities of St. John's, Mount Pearl and the Town of Paradise." Students were divided into

problem in St. John's and surrounding area was to build one treatment plant in each community with novel methods of effluent discharge into St. John's harbour.

The graduate students involved in this project benefitted from the experience of working on solutions to local problems while the three communities benefitted from the expertise of environmental engineering students and their assessment free of charge. A project on contamination at Argentia is planned for this year's class.

A unique feature of the program is its interdisciplinary, "environmental systems" approach. Students study environmental engineering from the point of view of public health and public protection. "The current trend in environmental engineering," says Seshadri, "is to focus on prevention." Preventive management and risk assessment, both qualitative and quantitative, are two current directions of environmental engineering which this program pursues.

The graduate program has been developed primarily from the point of view of economic development. It will provide Newfoundland and Labrador companies with the personnel needed to make them competitive in Canadian and global markets. The environment industry is one of the fastest growing sectors of the Canadian economy and the demand for skilled personnel in a variety of environmentally-related occupations is steadily growing. Ω

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COOPERATION Agreement on
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**(LABORATORY, continued from
page 18)**

cussing, and then determining the appropriateness of activity for the emerging curriculum that they experience, some for the very first time. Its potential for their own teaching assignment was paramount. The presence of the new laboratory enabled each to experience logistical constraints such as acquiring the necessary component resources and supplies needed to support a program of technological education, issues related to sharing the same resources, the opportunities offered to use conferencing as a means of providing education, and how to extinguish or dump outmoded practices. Other issues related to sociological concerns emerged and these were reviewed as they related to new physical facility designs. These included equitable access to new technology programs for all children in the school system regardless of ability level and delivery capability of school systems to even offer the emerging programs.

Providing enhanced technology education facilities as centres that house teaching resources was discussed along with diversity of problems associated with administrative details required for effective management of such facilities.

In spite of their varied back-

ground and qualification levels, the participating teachers produced a high level of work that attests to the vitality of this new facility. Their work has been arranged and published on the WWW, appears on a number of individual home pages, and is evident in designs of curriculum activity presently used in their own teaching. The faculty will endeavour to link to these resources in the near future. Ω

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Project Profile

Labour Relations: A Vision for the Future

labour and management cooperate in a unique initiative to make recommendations for a new labour relations code

by
Albert Johnson

Business and labour agree that the current twenty-year-old labour relations act is obsolete. Many changes have occurred in the economy indicating that new legislation is required. First and foremost, our economy has experienced a fundamental shift from goods-producing to services-producing. We now have a more educated labour force and more part-time workers. In manufacturing, low-technology, low-skill and low-wage jobs are being lost while high-technology, high-skill, and high-wage manufacturing employment continues to expand. The small business sector has accounted for a greater percentage of all employment increases over the 1978-1992 period. Work hours are being reduced as workers take productivity gains in the form of leisure rather than income. Flexible working arrangements are being sought by employers as a way to increase pro-

ductivity and use production capital more efficiently. Employees need increased flexibility to improve the balance between their work and private lives.

The provincial government recognized the need to review and revise the present labour relations process. A series of questions was presented in "Exploring Options", a discussion paper released by the government in the summer of 1994. By the end of May 1995, the Department of Employment and Labour Relations had received twenty-four briefs in response to the paper.

The Advisory Council on the Economy (ACE) proposed a process that would bring all stakeholders together to arrive at solutions through debate and discussion. The government agreed to place its initiative on hold to give the process proposed by ACE an opportunity to arrive at a

LABOUR RELATIONS A VISION FOR THE FUTURE



David Alcock, chair of the working group, addresses the participants at the opening session of the final conference of the Labour Relations Initiative.

consensus. First, ACE established an employer and labour working group made up of stakeholders from members of the labour relations community. The working group and a small secretariat, that was created to do research and support the activities of the working group, started their work in August 1995.

The first task of the working group was to develop a set of operating principles and define objectives. The objective of this initiative was two fold:

1. to create recommendations to improve the climate in labour-management relations
2. to make recommendations concerning the current legislation in this area for the government of Newfoundland and Labrador.

In order to reach this objective, the working group and secretariat carried out detailed policy research and analysis. The working group conducted discussions with provincial stakeholders. They started the consultation

process by hosting an opening conference. The goal of the conference was to bring together a broad representation of labour and management to formulate recommendations for government that would contribute to a legislative framework for labour reform.

After keynote addresses by then premier Clyde Wells and labour relations authority Brian Langille, David Alcock, Chair of the Working Group-Labour Relations Initiative, set the tasks for the discussion groups that followed. The bulk of the conference day was left to six discussion groups. Each group considered nine questions, identified issues and offered solutions for reform through discussion that arose out of these questions:

- Does our labour relations climate help or hinder productivity and competitiveness?
- What changes are needed to promote a more harmonious labour relations climate, and what legislative changes are required?
- Should labour relations legislation be consolidated?

- What should be the role of government in labour relations?
- What should be the role and structure of the Labour Relations Board?
- Does labour legislation protect the rights of the employee/employer/union?
- Does third-party intervention and/or judicial review impede good labour relations?
- In what ways can we improve dispute settlement mechanisms?
- What other innovative/creative ways of improving labour relations do you suggest?

The working group also carried out detailed research and analysis, examined the experiences of other provinces and countries, distributed over 3000 newsletters on three separate occasions and met with and received submissions from provincial stakeholders.

During their consultations the working group received many suggestions about how to improve the current situation. It was suggested that government's role as legislator versus its role as employer be better defined. Others suggested that:

- government should set the example for good labour relations and provide leadership in creating a model labour relations partnership
- the department responsible for labour issues should be separate from government
- an equitable balance of power be created for employers and employee organizations of different sizes and strengths
- delays in the Labour Relations Board and arbitration process be reduced
- a full-time board and/or chair for the Labour Relations Board be appointed
- labour relations legislation be consolidated

- the rights of employees and employers be balanced during the certification of a union.

The working group used the information gained from the research, discussions and the opening conference to create a framework for a new Labour Relations Code. In developing its recommendations, the working group scrutinized each recommendation with a filter of five questions before they were accepted.

1. Does the recommendation encourage a new climate in labour-management relations, or improve the existing legislation?
2. Is the recommendation fair and balanced for both parties?
3. Is the recommendation innovative and does it accommodate the labour relations requirements of today while anticipating the new and emerging trend of the future? If not, can we reach outside the existing framework for alternatives?
4. Does the recommendation improve flexibility, stability, cooperation, and equity in the workplace, and do we need to consult with the larger labour-management relations community on this issue?
5. How does the recommendation compare with other jurisdictions in the country and can this particular recommendation contribute to creating new and better labour relations legislation for Newfoundland and Labrador?

After numerous meetings of the entire working group and several meetings of various sub-committees, the delegation was ready to present its recommendations to the labour and management community at a two-day

conference held on September 5 and 6, 1996.

At the second and final conference of the Labour Relations Initiative the working group presented the draft of their recommendations. Forty-nine recommendations were offered for consideration on topics that included:

Establishing a mechanism to foster cooperation between labour and management was high on the list of priorities for the working group.

- the rights, duties and practices during union certification
- the equity and efficiency of labour relations legislation
- the organization of parties for collective bargaining
- the collective bargaining cycle; the construction industry
- essential services in the public sector
- strikes and lockouts
- dispute settlement mechanisms; and the structure and role of the Labour Relations Board.

Establishing a mechanism to foster cooperation between labour and

management was high on the list of priorities for the working group. One of the recommendations proposed addresses this issue and is one of the most significant presented to the conference.

Recommendation 1: Centre for Cooperation in Labour-Management Relations — A new Centre for Cooperation in Labour-Management Relations should be immediately created through the introduction of appropriate enabling legislation. This legislation should ensure that the centre operates independent of government, is wholly owned and controlled by the labour and management stakeholders, and operates in a bipartite manner.

The primary purpose of the centre would be to act as a permanent forum for labour and management in the province. The centre would:

- provide a liaison between labour and management, and government on all matters where consensus exists between the parties
- be a permanent, cooperative and non-adversarial working organization for labour and management
- allow labour and management to regulate themselves insofar as is possible and practical through the development of joint public policy positions on labour relations issues
- provide a central, authoritative research and education source on best practices in the areas of innovation, productivity, flexibility and competitiveness for the labour relations community
- recommend appointments to the Labour Relations Board, advisory councils, task forces and commissions
- discharge any public policy tasks or assignments government may wish to refer to the centre.

The 49 recommendations repre-

Working Group Members

David Alcock
Chair

Elaine Price
Vice-Chair

Charles Rennie
Vice-Chair

Bill Alcock

Dave Curtis

Bill Dawson

Leonard Knox

Earle McCurdy

Gerard McDonald

Bill Parsons

John Peddle

Mike Power

Ron Smith

The Secretariat

Joan Brown
Conference Coordinator

Alison Coffin
Conference Manager

Ken Curtis
Researcher

Christine Hollett
Project Manager

Austin Thorne
Facilitator

sent a compromise reached by the working group members. The conference participants were asked to consider the recommendations as a whole package, since none were developed independently of the others, and offer suggestions for their enhancement. At the final conference session the comments and suggestions offered by the participants were summarized. All but a few of the recommendations received the support of the participants through "general agreement in principle" accompanied by suggestions to enhance the proposed policy. Apart from the conference, members of the labour relations community had until September 23, 1996 to make submissions to the working group. The members of the working group of the Labour Relations Initiative are scheduled to present their findings to government early in November 1996. Ω

(INTERNET, continued from page 20)

resources developed and provided are applicable to the age group and complement the curriculum being examined in the classroom. Ω

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Fisheries and Marine Institute of

Memorial University of
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STEM~Net

SchoolNet

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Labour Relations: A Vision for the
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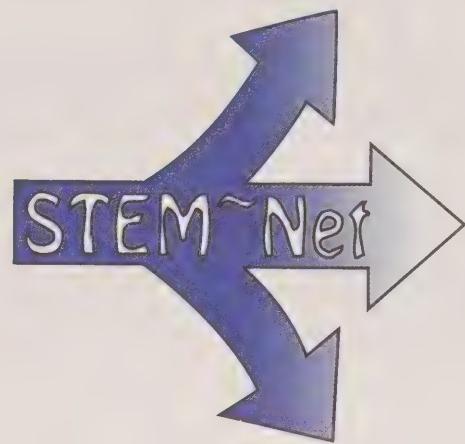
**LOOK FOR
BACK ISSUES
OF
PROSPECTS**

**on the
World-Wide-Web
at**

**[http://www.stemnet.nf.ca/
community/prospects/](http://www.stemnet.nf.ca/community/prospects/)**

A STEM~Net Progress Report

STEM~Net access and services continue to grow



by
Harvey Weir

LOCAL INTERNET ACCESS BY SCHOOLS AND TEACHERS

Good news for schools and teachers in local-dial areas! NLnet was the regional Internet system that was built by Memorial University and extended across much of the province during the past three years in partnership with STEM~Net. Through NLnet, STEM~Net was able to increase the percentage of teachers within local access regions from 25% in September of 1993 to approximately 70% by September of 1996. Earlier this year, NLnet was tendered to the private sector, and the winning bid was submitted by a consortium led by Cable Atlantic. As part of their NLnet proposal, they agreed to:

1. provide free back-bone dedicated Internet access to participating STELLAR Schools in their 22 local-dial areas, provided that schools pay for the local telephone-line and equipment costs needed to connect from the school to the

NLnet node

2. provide up to 10 hours per month, outside of the dedicated STELLAR School access, for teaching related usage to each full-time K-12 teacher for a flat annual fee paid by STEM~Net
3. provide a discounted package for teachers in these local-dial areas under a new service called "The Zone"
4. increase the number of local-dial regions to a total of 25 during this school year and to 35 during the following year.

STEM~Net has received a contribution from the Canada/Newfoundland COOPERATION Agreement on Human Resource Development to assist school boards and schools in the 22 local-dial regions to take advantage of the Cable Atlantic offer. More than 50%

of schools and approximately 70% of teachers and students are located in these regions. By early November, it should be possible to provide dedicated SLIP access for each staff room STEM~Net computer in local-dial areas. Then, as each school is granted STELLAR School Status by its school board's STELLAR Schools Council, each networked computer can be connected, extending access to students for class projects.

THE CRTC DECISION ON TELECOMMUNICATIONS TARIFFS FOR EDUCATION

The CRTC policy on special tariffs for education has just been announced, and it looks like bad news for rural schools, students and teachers. Although this CRTC decision will have to be subjected to a detailed analysis, it appears that the Stentor telephone companies, including NewTel Communications, have not been given the flexibility to provide truly affordable access to STEM~Net

By early November, it should be possible to provide dedicated SLIP access for each staff room STEM~Net computer in local-dial areas.

and SchoolNet. It appears that the CRTC's priorities are competitive equity for long-distance carriers rather than educational and regional equity for Canadian school students and their teachers. Because this decision could affect the future of rural SchoolNet, both STEM~Net and the Canadian Educational Network Coalition are looking at their short term and long-term options, and will be consulting with representatives of teachers, parents and others during the next few weeks.

As reported in an earlier issue of Prospects, STEM~Net has support from the Canada-Newfoundland COOPERATION Agreement on Human Resource Development to help more than 100 long-distance schools participate in the Stentor/SchoolNet satellite project. This project was designed to improve the speed and quality of the "down-link" from the Internet to schools using a high-speed satellite channel. However, it depends on an affordable long-distance return telephone line from each school and the support of Stentor to help pay the satellite charges.

SCHOOLNET NEWS NETWORK (SNN)

You've heard of CNN? Well, now there's SNN! The first edition of the new SchoolNet News Network was

launched on September 30, 1996. The virtual event included an online chat between Jon Gerrard and school students in Corner Brook, Newfoundland; Winkler and Portage le Prairie, Manitoba; and Brampton, Ontario. Gerard is the Secretary of State for Science, Research and Development.

SNN, and its French language counterpart, Rédaction de Rescol (RDR), is designed to stimulate students' interest in the media, current events, social sciences and government. The first edition included articles from future journalists in K-12 schools all across Canada. The second issue is in partnership with the Discovery Channel. It is focusing on science and technology issues and is publishing during National Science and Technology Week.

This project was developed by STEM~Net in partnership with the SchoolNet program of Industry Canada. Gerard described the project as a great example of what can be accomplished when federal and provincial governments, post-secondary institutions and K-12 schools work in partnership. Further information can be obtained from the SNN link on the STEM~Net home page at <http://www.stemnet.nf.ca> or by emailing snn@calvin.stemnet.nf.ca.

Ω

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(CAREERS, continued from page 2)

developing this resource in partnership with the Canada-Newfoundland COOPERATION Agreement on Human Resource Development, Human Resources Development Canada, and the provincial Department of Education.

This is just a beginning. Try these sites. Discover others and share your findings. Ω

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Request For Proposals

Pilot Projects For Distance Education and New Media Learning

The Canada-Newfoundland Agreement on Economic Renewal was signed June 20th, 1996. A component of this agreement provides funding for the development and delivery of innovative pilot projects in distance education and new media learning at post-secondary levels.

ELIGIBLE APPLICANTS MAY INCLUDE PARTNERSHIPS AMONG:

- Provincial public universities or colleges
- Other publicly funded provincial institutions or centres
- Departments of government

NOTE: Other institutions and agencies will be eligible to access this initiative only as partners to a public institutional lead contractor. Preference will be given to pilots demonstrating collaboration between the public and private sectors and which assist in human resource development in the advanced technical area. Proposals must be signed by appropriate authorities from each partner.

ASSESSMENT CRITERIA FOR PROPOSALS:

- Demonstrates an innovative, efficient and cost-effective approach to the design or use or delivery of distance and open learning.
- Involves the development of a course/short program within a cluster of programs leading to certification or maintenance of certification.
- Demonstrates incremental benefit to the province and the private sector.
- One partner must be capable of utilizing the results of the project commercially, preferably in an export market.
- Builds employability skills in the field of distance educa-

tion and new media learning and/or creates direct employment in that field.

- Supports international standards where applicable.
- Would likely not proceed without this funding support.
- Includes an evaluation and monitoring plan.
- Responds to a public sector need which will lead to a commercial opportunity, and has long-term, clearly defined institutional and/or commercial potential.
- Represents a partnership of two or more players from various sectors, who are also contributing to it in cash or in kind. Partnerships may include:
 - the university or college
 - Newfoundland and Labrador private enterprises
 - provincial, national or international institutions or private enterprises
 - departments of government, crown corporations or research centres (as self-funding participants only)

**MAXIMUM ERA Contribution per Project
\$50,000**

ADDITIONAL INFORMATION MAY BE FOUND ON THE WWW:

http://www.wordplay.com/open_learning_nf/

PROPOSALS MAY BE FORWARDED TO:

Federal/Provincial Assessment Committee
Post-Secondary Distance Education and New Media
Learning
Economic Renewal Agreement
c/o Open Learning and Information Network
Spencer Hall, Room 4012
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Telephone inquiries to (709) 729-4310

Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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COOPERATION



Building Excellence in People

The COOPERATION Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the needs of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community and enterprise education, as well as provide programming for high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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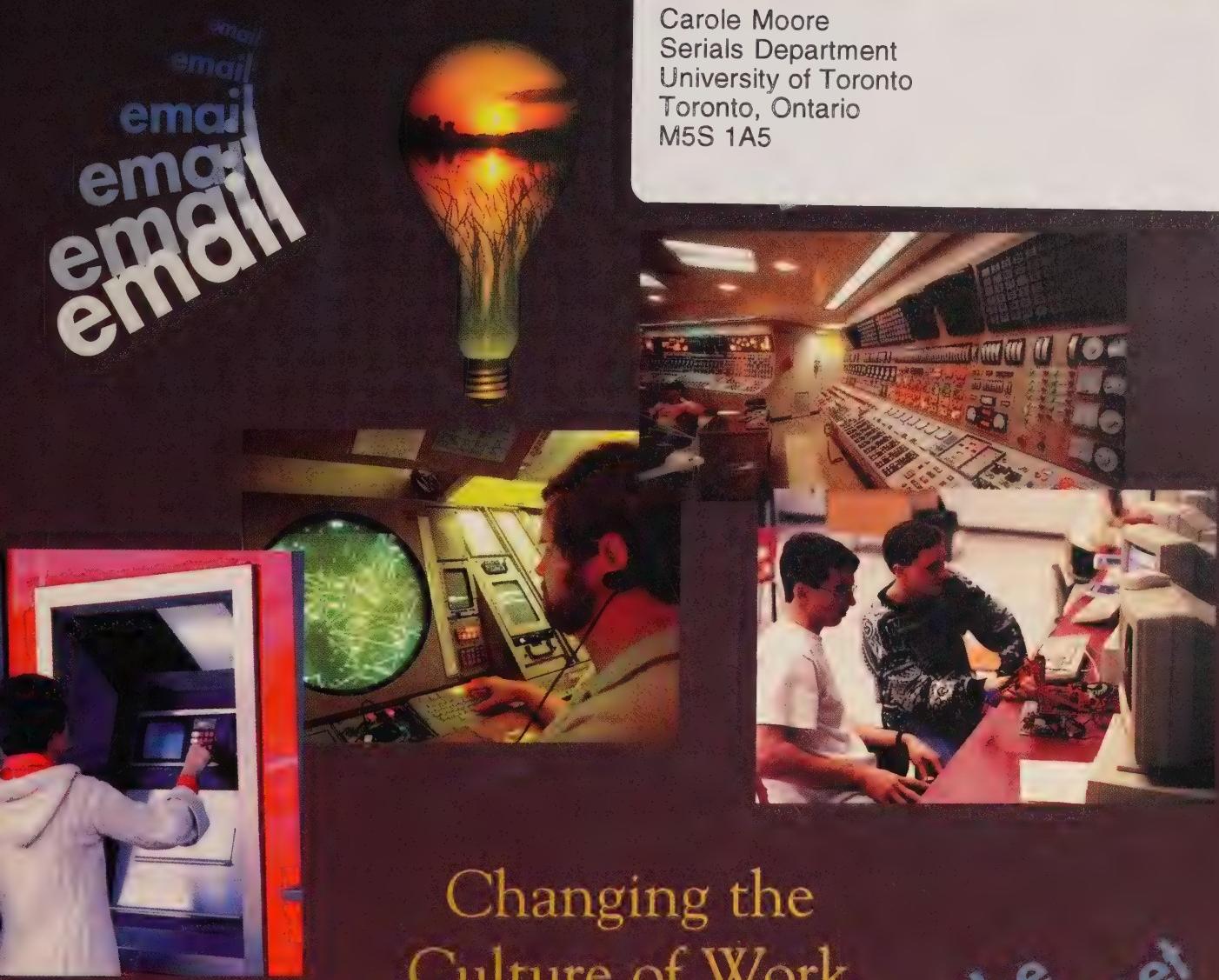
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The Journal of the Canada/Newfoundland
COOPERATION Agreement on Human Resource Development

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Changing the
Culture of Work
and Learning with
Technology

The
Internet

Prospects

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Changing the Culture of Work and Learning with Technology

The culture of our workplaces and our educational institutions is dynamic. Many factors exert influence and cause shifts in the way we work and learn. One major influence that drives the dynamics of culture is technology.

In the late 18th century, the technology of the industrial revolution brought with it great cultural changes for many people throughout Western Europe. Families, whose ancestors had lived in rural settings for generations, migrated to growing towns and cities. Urban populations boomed with the demand for factory labourers. For the individuals who made the move, their culture changed dramatically. The hours they worked, the conditions they worked under and the conditions in which they lived changed because a faster way to produce cloth had been invented.

The invention of the internal combustion engine in the late 19th century revolutionized transportation. Henry Ford's assembly line technology and the Ford Model A brought the automobile to the masses. In the 1960s, television and satellite communications brought live pictures of world events into our homes for the first time.

In the 1990s, computers and

information technology are causing significant changes in the way we work and learn. This issue of *Prospects* explores how these new technologies are influencing the culture of our workplaces and our educational institutions. Significant changes in technology almost always prompt shifts in the economy.

"Promoting Successful Youth Transition: Facilitating an Enterprise Culture in Schools" highlights initiatives implemented by the Department of Education to encourage an enterprise culture in our youth to help them take advantage of opportunities offered in the new economy. The small business sector of the economy is growing dramatically. An article by Shari Costello of the P.J. Gardiner Institute for Small Business Studies offers insight into the concerns faced by managers of small businesses.

Other articles highlight issues concerning the influence of the World-Wide-Web (WWW) on instruction in our educational institutions and explore the influences of these new technologies on the way we work.

Computers and information technology, like technological innovations of the past, are having a major impact on the way we live. The quality of the influence these technologies have

exerted on our culture, good, bad or indifferent, will be judged sometime in the future just as we now attempt to analyze the significance of the industrial revolution, the advent of the automobile and the presence of television. Like those before them, these technologies and their impact on our culture will become part of the web of history, a web that has been with us long before the WWW and will be with us long after the WWW is replaced by something else.

Trudi Johnson
Albert Johnson
(editors)

The next issue of *Prospects* will focus on teaching with technology and integrating technology into the curriculum of the K to 12 and post-secondary systems. Please send submissions on this or other topics relevant to human resource development to the editors at the address found on the last page. Your submissions will be carefully considered for publication.

DIRECTORY ASSISTANCE

Finding Work and Career Information on the World-Wide-Web

accessing points of interest for school counsellors, career education teachers and parents

The Internet is offering new and efficient methods for people to find work and for businesses to find the employees they need to fill positions. Many companies include links on their homepage to information from their human resources departments. Several universities, colleges and other educational institutions, government departments, and not-for-profit groups also maintain a listing of current employment opportunities available in their organizations. Other web sites offer a forum for individuals to display their resumes or offer links to personal homepages where individuals provide information on their skills, experience and credentials.

Government agencies and private sector organizations involved in human resource development recognize the potential of the World-Wide-Web (WWW) to enhance the job

search process for people out of work or for individuals seeking to move to a different employment situation. Specialists in the area of career planning and counselling believe that there is a need for a national, electronic database of career, labour market, human resources development information, and other related topics to inform Canadians about work and learning opportunities in their own region and in other regions across the country. CanWorkNet (<http://www.canworknet.ca>) is the result of an initiative undertaken by Human Resources Development Canada, Industry Canada, The National Life/Work Centre, The Canadian Labour Force Development Board, the Canadian Career Development Foundation and representatives from each province.

CanWorkNet is a searchable directory on the Internet. It offers a

user-friendly interface that links Canadians to more than 1,000 Internet sites which provide information and services to help people make informed decisions about choosing a career or occupation, finding work, or getting an education. The web site offers information concerning jobs and recruiting, career planning, training and educational opportunities, the labour market, financial help, the workplace, and community services available to assist individuals with special needs.

One of the icons on the CanWorkNet homepage is a link to the Electronic Labour Exchange (ELE), a user-friendly resource available at no cost to employers and work seekers. The ELE (<http://www.ele-spe.org>) is Canada's premier recruitment tool on the Internet. It matches work to people and people to work faster than traditional methods. By using the ELE, both employers and work seekers can build skills profiles by choosing from among 25,000 recognized occupations.

For the work seeker, the ELE provides an opportunity to create a skills profile by completing a comprehensive checklist that stores information regarding the individual's education, experience and credentials. The work seeker then requests a match to an employer who is looking for an individual with similar skills. If no matches are found immediately, work seekers can provide contact information and advertise their profile on the system.

The ELE lets employers advertise their vacancies to a vast number of work seekers. It filters out those (continued **CAREERS** on page 5)

Education on the Internet: Does it have Value?



by
George Haché

Whether the nature of education, its quality, level, or training options are causal to overcoming economic isolation is an on-going discussion in all cultures. The growth of education provisions on the Internet or WWW in recent years has certainly contributed to the debate. Currently, the nature of online learning, how much potential it has to help individuals assimilate the skills required for meaningful education and livelihood, and access to the Internet itself are at the forefront in modern education and policy debate. There is no more convincing evidence of this case than the recent address to the American people delivered by Bill Clinton. He described his administration's intention to make a concerted effort to ensure that every 12 year-old in American schools will be "able to log on to the Internet."

Being aware of traditional criticisms that accompany the introduction of new learning technology in

schools (remember television), we are understandably prudent when the Internet is mentioned in the context of teaching. It follows that educators seek to quantify both the merit and demerit of existing Internet provisions and contexts for which they were prepared. We seek hard evidence of effective use, before fully endorsing or using its provisions. (Interestingly, very high quality educational television is available to us and viewers tune in to public access channels where they gather information that informs, compels viewers to engage in discussion, evokes emotion, and clarifies political patterns.)

It is all leaving an indelible mark on the evolution of information transfer, if not education. Having moved from the curiosity and the domain of data transmission used principally by business, Internet technology is establishing a firm footing in an increasing number of scholastic areas and compelling non-user teachers to consider how to use computers

in their daily practice. It has teachers questioning the potential effects of advancing Net-based technology in relation to:

- the extent of hardware and investment of teacher preparation that is required
- the nature of system wide deployment that is required
- policy that is necessary to ensure fair access

Call it the educator's particular comfort zone, it is somewhat dependent on the extent of familiarity with the new technology. It follows that issues such as control of access, the strength and currency of the technology, and skill required for its effective use are at the forefront of concerns. What appears to be left is definitive evidence in all these areas followed by effective enabling policy.

For anyone travelling on the Internet, remarkable educational advantages are evident. A number of these were identified by Paul Kjellander (<http://www.state.id.us/k12rept.htm>) in his references to K to 12 Internet provisions. Threaded through his article is not only the view that the Internet is a potent medium for information storage and retrieval, but also a means by which an expanding audience can interactively participate with individuals from all walks of life and corners of the globe. In his article, Kjellander provides a list of educational developments that have occurred and suggests others that are possible. The list is worth reviewing.

Elsewhere on the Internet are many examples of education provisions offered by groups, teachers, students, and others who have found compelling ways of exploring and using the technology of the Internet.

What they are offering is evidence that certainly strengthens a view in favour of the Net's potential. Look into the following sites and judge for yourself. Some will have the appearance of maturity while others are in developmental stages. The following samples are unrelated sites on a variety of topics. These sites are solid

- <http://www.rescol.ca/collections/canadiana/Enhig/content/page.htm>
- <http://www.nceet.snr.edu/classres.html>
- <http://www.unibase.com/~visions/>
- <http://www.trainingsupersite.com/>
- <http://www.itp.berkeley.edu/>
- <http://web66.coled.umn.edu/>



examples of exemplary material to attract learners to the Internet but they are no guarantee that the Internet provides effective education provisions. These and others attest to the breadth of offering and the potential for educators to be involved. (Be mindful that some are incomplete but do suggest room for substantial improvement.)

Perusing these sites and others leaves one with mixed impressions. Some of the sites are well linked to provide an abundance of content and on the surface appear to have been developed with a fair measure of scrutiny. Some are overly commercial but packed with information sets. Then there are others that are premature, lacking in depth, providing little evidence that they have been exposed to consistent follow-up and may have only questionable value. In all, an impressive display of content.

It leaves two central questions to be answered. First, what is the necessary teacher preparation for critical inquiry into the forms of learning that are currently accessible on the Internet and what knowledge and skill are required of teachers who wish to present material on Internet platforms? Secondly, what constitutes fair and equitable access to the learning content that is present on the Internet and its allied resources so teachers can get involved and improve on the potential offerings of the Internet's systems?

In effect, the Internet may have provided us with an invaluable lesson. It has prompted some of us to question and reflect on the development of instructional material. We consider its quality, content, accuracy, instructional design components, evaluation

procedures and whether or not the activities provide appropriate, meaningful learning. The Internet has enabled us to use very sophisticated but relatively easy to use tools (HTML, Java, MPEG and VRML) to create dynamic education material, some interactive. These tools have provided us with innumerable examples of various delivery modes to teach fairly complex ideas that were often, at best, difficult to do using conventional means available to instructors. For example, students can monitor a full space shuttle trip or tour the south pole with individuals who are actually there, in real time.

If we are having difficulty measuring whether learning on the Internet has value, it is probably because our conventional view of education has not focused on systems that are driven by the consumer where educational material is created and presented on demand. We are left inspecting the material to determine how it fits the present curricula and looking for good incidents of problem-solving, decision-based learning and other components we have always looked for. The Internet may fall short in providing assistance in learning the basics. These are still the responsibility of the traditional school.

The Internet's value, in the context of traditional school systems, may best fit if teachers help their students develop the ability to extract the necessary information, and even training, if and when it appears useful to their aspirations. Schools may want to focus on providing students with the preparation and tools to build understanding, as well as providing encouragement to value critically and explore creatively. If this is done in a fashion that provides each student a base to extract and apply knowledge to ultimately become more self-sufficient, then the question has been answered. Ω

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(CAREERS, continued from page 2)
whose qualifications do not meet their requirements and provides them with a list of work seekers who match or very closely match their needs. The job profile offered by the employer can be stored on the system for future work seekers.

The concluding page of the ELE site offers a link to the National Graduate Register (NGR - <http://ngr.schoolnet.ca>). The NGR is an initiative being piloted by Industry Canada in the Atlantic region and other selected locations. The purpose of the site is to give students or those who have graduated within the last three years from a post-secondary institution the opportunity to add their resumes to the NGR database. The service is provided at no cost to students and graduates and gives them an opportunity to gain greater access to employers, an economical way to market their skills, and electronic access to guidance, career and labour market information.

Students or graduates register with the NGR by entering their resumes directly online. The registrants are prompted with questions about their education, skills, experience and aspirations. The process takes approximately 25 minutes. There is a quick resume option that takes about five minutes to complete. It gives registrants an opportunity to

complete the longer version later. They are given a user identification and passcode so they can maintain the accuracy of the information. The system randomly verifies the academic information with participating post-secondary institutions. Industry Canada has been actively promoting the NGR to employers across the country.

Many provinces are playing a major role in developing, and collecting career and employment information for the Internet. The provincial Department of Development and Rural Renewal, in partnership with local government and community organizations, has embarked on the development of a web site called Newfoundland and Labrador WorkNet (NLWorkNet). This site will be accessed through the province's homepage or CanWorkNet. The categories of information will be similar to CanWorkNet and will therefore ensure that the national systems contain comprehensive information on the province. At the same time, the website will be responsive to needs throughout Newfoundland and Labrador.

These sites are good places to start but they are just a few of the hundreds of sites that are available. Job hunting on the Internet is time well spent and is proving to be a valuable resource for job seekers and employers. Ω

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Promoting Successful Youth Transition

facilitating an enterprise culture in Newfoundland and Labrador schools

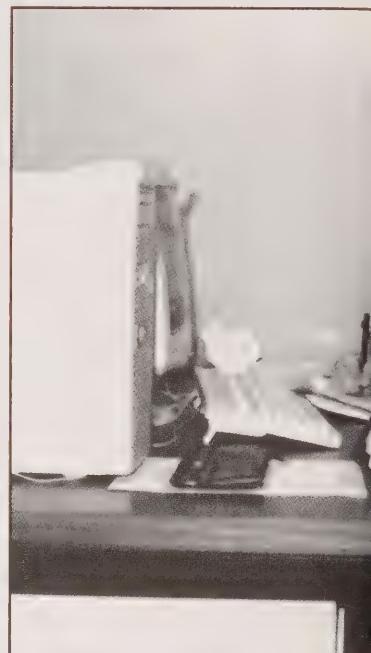
by
Albert Johnson

New attitudes towards work, innovations in technology and shifts in the domestic and international economy are encouraging a large segment of the population to cultivate and sharpen their enterprising skills. Small business is a key element in our current economic landscape and experts predict that this sector of the economy will continue to grow well into the 21st century. Preparing our young people to take advantage of opportunities offered by the changing economy is the focus of a variety of initiatives undertaken by the Division of Program Development of the Newfoundland and Labrador Department of Education.

The division has been engaged in several initiatives in the area of economic-enterprise-entrepreneurship education for the past six years. During the 1989-90 school year, research was conducted in the area of economic education. The findings of

this research were offered in *The Report on Economic Education in Newfoundland*. The authors recommended that more emphasis be given to the study of economics and entrepreneurial studies especially in the senior high school program.

The Department of Education responded to this report by establishing the *Economic Life Skills Project*. The first phase of this project began in March 1990 in St. John's with an Entrepreneurship Symposium. As a result of the symposium, a new curriculum initiative was established in enterprise education. During the second and third phases of the *Economic Life Skills Project*, emphasis was placed on the development of local courses in enterprise education for senior high school and on professional development activities for teachers. During the 1992-93 school year, the Division of Program Development implemented a three-year action plan to address the needs identified by the





research. *Promoting Successful Youth Transition: Facilitating an Enterprise Culture* is a multi-faceted initiative funded by the COOPERATION Agreement on Human Resource Development. It uses a holistic approach to promote enterprise education not only in high schools, but in schools at all levels of the K to 12 system.

The vision for enterprise education in Newfoundland and Labrador is: "to promote an enterprise culture that empowers and energizes youth to be problem solvers, innovative, creative, responsible, and self-reliant and thereby enhance the quality of their lives." In order to achieve this vision the Division of Program Development has focused on objectives in five areas:

- curriculum development, implementation and evaluation
- promotion of resource-based learning

- integration of technology
- teacher training and professional development
- partnerships in economic and enterprise education

CURRICULUM DEVELOPMENT AND PROMOTION OF RESOURCE-BASED LEARNING

The first goal of the project is to facilitate the expansion of economic/enterprise education curriculum development, implementation and evaluation in partnership with the school districts. In the 1994-95 school year, a working group identified key concepts necessary to promote economic literacy at the primary, elementary, intermediate and secondary school levels. The following year a working paper outlining the key stage curriculum outcomes for the end of grades 3, 6, 9 and 12 was drafted. This paper also outlined a specific curriculum model to be used for K to 12 economic education. It suggested that economic literacy should be integrated across all curriculum areas for the primary and elementary grades and that specific modules be developed as part of the intermediate social studies program. At the senior high school level, it promoted the development of separate courses in economics, enterprise and entrepreneurship.

It was recognized that new classroom resources would be needed to promote these outcomes. During the 1994-95 school year, the division participated in a joint curriculum development project with the Atlantic Canada Opportunities Agency (ACOA) and the Maritime Provinces Education Foundation (MPEF). *Pathways to Enterprise* is a teachers' resource for elementary teachers (grades four to six) which promotes enterprise education across the curriculum. Ten elementary school teachers in Newfoundland and Labrador participated in the piloting

of the document and wrote provincially-based case studies for the resource. *Pathways to Enterprise* was completed in the fall of 1995 and has been implemented in the province's schools.

During the 1993-94 and 1994-95 school years, the Division of Program Development also redesigned the intermediate social studies program which places more emphasis on economic literacy. A student textbook and teachers' resource manual for the new grade 9 course, *Atlantic Canada in a Global Community* is being developed and piloted in ten schools during the 1996-97 school year. The course includes five strands:

- Physical Environment
- Culture/Social Environment
- The Economy of Atlantic Canada
- The Impact of Technology
- Provincial/Regional/Global Interdependence

The new course is designed to make students aware of economic issues and the importance of enterprising skills in promoting prosperity in Atlantic Canada. The course and the new resource should be ready for delivery to the province's grade nine students in September 1997.

The action plan also included a strategy for the development of a 3000 level course for senior high schools. A working group developed Enterprise 3205, a two credit course designed to provide an understanding of the world of enterprise and to ensure that students engage in enterprising ventures. The course includes topics such as:

- entrepreneurial studies
- self-assessment, self-improvement and self-actualization
- communications in the global economic environment
- the role of technology in business

"We need to instill in our students the importance of initiative and self-reliance," says Joshi. "Helping our students identify and prosper from the opportunities that are available in these areas is important to them..."

- the search and development of new venture opportunities
- the study, creation, application and implementation of a venture plan

Enterprise 3205 is currently offered in 71 schools and has a province-wide enrolment of 1908 students (see sidebar on page 10, "The Enterprise Centre at Booth Memorial"). It is planned that the course be adapted for distance delivery in the near future.

Other senior high school courses in enterprise education have been developed at the local level. These courses have been developed by the school districts and have a local focus. For example, some of the courses deal with enterprise, tourism and hospitality.

The second strategy implemented by the Division of Program Development through the action plan is the promotion of resource-based learning in economic and entrepreneurial studies. To foster the use of this instructional technique, teaching resources for Canadian Economy 2103/Economie Canadienne 2133 were evaluated, purchased and distributed. Printed materials were pur-

chased but greater emphasis was placed on obtaining non-print learning resources such as computer courseware, videodisc and CD ROM.

INTEGRATION OF TECHNOLOGY

Integrating technology into economic/enterprise education is emphasized in the action plan. Smita Joshi, curriculum development specialist in enterprise education at the Department of Education, is exploring ways to utilize electronic networks in enterprise education classrooms. Joshi believes that the World-Wide-Web will be an influential resource that will help broaden the curriculum and greatly enhance methods of instruction. A web page has been created for enterprise education and can be found through the STEM~Net homepage (<http://www.stemnet.nf.ca>) under Curriculum Resources.

TEACHER TRAINING AND EDUCATIONAL PARTNERSHIPS

Joshi has been instrumental in promoting enterprise education through the establishment of educational partnerships between the department and outside agencies

including the P.J. Gardiner Institute and the Faculty of Business Administration of Memorial University, St. John's Board of Trade, Newfoundland and Labrador School Boards Association, Canadian Foundation for Economic Education, school districts, and the St. John's YM-YWCA Enterprise Centre. She believes that this strategy is vital in promoting enterprise culture in our youth. For example, the Enterprise Seminars, conducted by the P.J. Gardiner Institute, facilitate the continuation of teacher training once these senior high school teachers attend the department's four-day Enterprise Education Institute.

These partnerships have assisted in highlighting student achievement in enterprise education as well. A number of Enterprise Student Showcases, organized by school district personnel, have been held throughout the province. Regional Enterprise Showcases are organized by school district personnel. Students who excel at the regional showcases are invited to a province-wide event. The provincial event for the 1995-96 school year was called the Enterprise Olympics and was held in Gander. The two and one half day conference was a joint venture between the YM-YWCA of St. John's and the Department of Education. Students became eligible to display their business concepts by performing well in either Market Your Thoughts or in their regional Enterprise Showcase. The conference agenda included seminars, entrepreneurial activities, motivational speakers, entertainment, networking and an awards ceremony. One hundred and sixty students attended the event.

Fourteen level III students from Greenwood Academy, Milltown, were judged the best entry at the 1996 competition. Their business plan dealt with aquaculture in Bay

d'Espoir. A 60 cm farmed rainbow trout was the centre-piece of the group's display.

POSITIVE RESULTS

The 1991 edition of *The State of Small Business and Entrepreneurship in Atlantic Canada* contained the results of a major study carried out in 1989 by researchers at Mount Allison University and the Université de Moncton regarding the status of entrepreneurship education in Atlantic Canada schools.

The study focused on students at the elementary and high school levels. The research examined the degree to which students were exposed to entrepreneurial concepts and influences and recommended ways that the education system could be modified to enhance the development of an entrepreneurial environment. Another purpose of the study was to establish a baseline for measuring the impact over time of efforts made to foster a stronger entrepreneurial culture in the region. Since the release of this research, all four Atlantic provinces have introduced enterprise and entrepreneurship education into their school systems.

In 1995, the Université de Moncton conducted follow-up research to the 1989 study to compare the attitudes of grade 12 students towards entrepreneurship in 1989 to those of 1995 grade 12 students. A reasonable degree of consistency with the 1989 report was maintained by surveying students attending grade 12 at the same schools and by using the same survey instrument. The questionnaire was designed to collect data concerning attitudes towards, exposure to, and experience with entrepreneurship both inside and outside the school environment. These included interpersonal contacts and networks, the intention to become an entrepreneur, personal characteristics and

competencies, and students' beliefs with regard to business related issues.

The study indicated that the most significant change in the Atlantic provinces between 1989 and 1995 took place in Newfoundland and Labrador. In 1995 students in that province were more likely to know female entrepreneurs, to make contacts within the business world, to learn about business and to be awakened to an entrepreneurial career through school. Researchers attributed the positive results to the approach taken by the province. Newfoundland and Labrador was the first province to begin the process of infusing enterprise/entrepreneurship education throughout the curricula, and to require at least two credits in enterprise education for high school graduation.

Several initiatives facilitated by the federal and provincial governments through programs like the COOPERATION Agreement on Human Resource Development have focused on building an enterprise culture. Joshi is pleased with the results of the new programs. "We need to instill in our students the importance of initiative and self-reliance," says Joshi. "Helping our students identify and prosper from the opportunities that are available in these areas is important to them. Offering them an opportunity to acquire the skills that will allow them to provide for themselves will have a meaningful and lasting effect on their self-confidence and the quality of their lives." Ω



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The Enterprise Centre at Booth Memorial High School

by
Bob Banfield

In December 1996, Booth Memorial High School in St. John's officially opened a new Enterprise Centre. The concept for an Enterprise Laboratory was prompted by a document initiated by the Department of Education in 1994 entitled, "The External Evaluation of the Enterprise Program." The study expressed a concern that Enterprise Education is less like social studies and more like science, with regard to the approach to teaching. As a result, it was recommended that the course might be better taught in a laboratory atmosphere, that is, a dedicated room with small clusters of furniture representing mini-open concept offices divided by sound absorbent baffles.

Funding from the COOPERATION Agreement on Human Resource Development (HRDA) was used to purchase 10 multimedia computers and appropriate software. Beyond this, Booth Memorial took on the responsibility of acquiring additional lab equipment such as furniture and related office accessories.

Through contributions from the former Avalon Consolidated School Board, Booth Memorial and the HRDA, the Enterprise Laboratory was officially opened. Plans are in place to expand the facility to twelve computers in the near future. The Enterprise classes are in the process of fund-raising to purchase additional office

equipment such as a fax machine, telephone and photocopier.

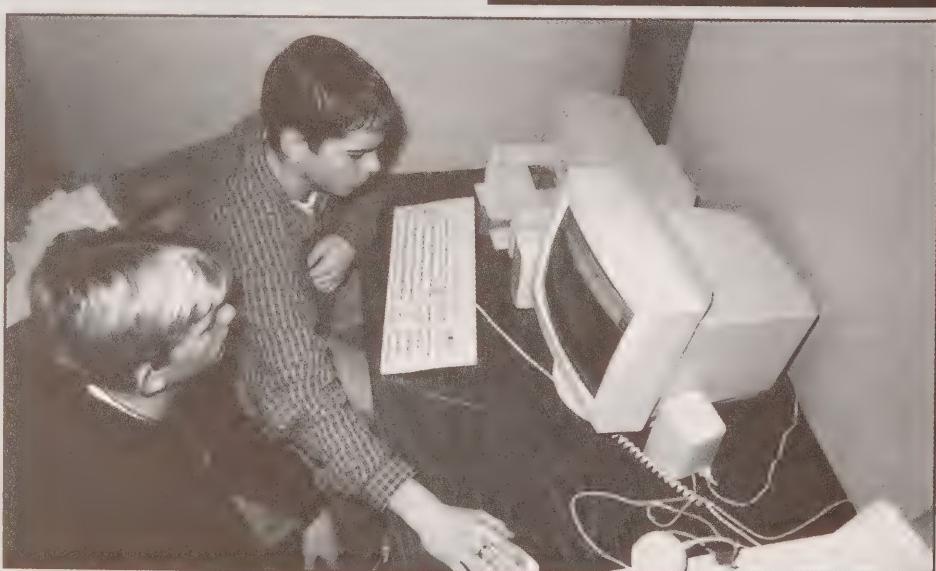
The Enterprise Centre at Booth Memorial allows students in Enterprise classes to take advantage of software which has been specifically developed for Enterprise 3205. The primary piece of software being used is "Planning for Success." This is an interactive CD ROM produced by the Canadian Bankers Association and the Canadian Federation of Economic Education. The theme of the CD is an Enterprise Centre with various floors, each providing information, ideas and skill development activities to help students develop business plans. Students also have access to word processing, desktop publishing, and accounting software. With the recent launch of Booth Memorial as a

Stellar School, students also have full Internet access, ultimately taking students well beyond the traditional classroom setting.

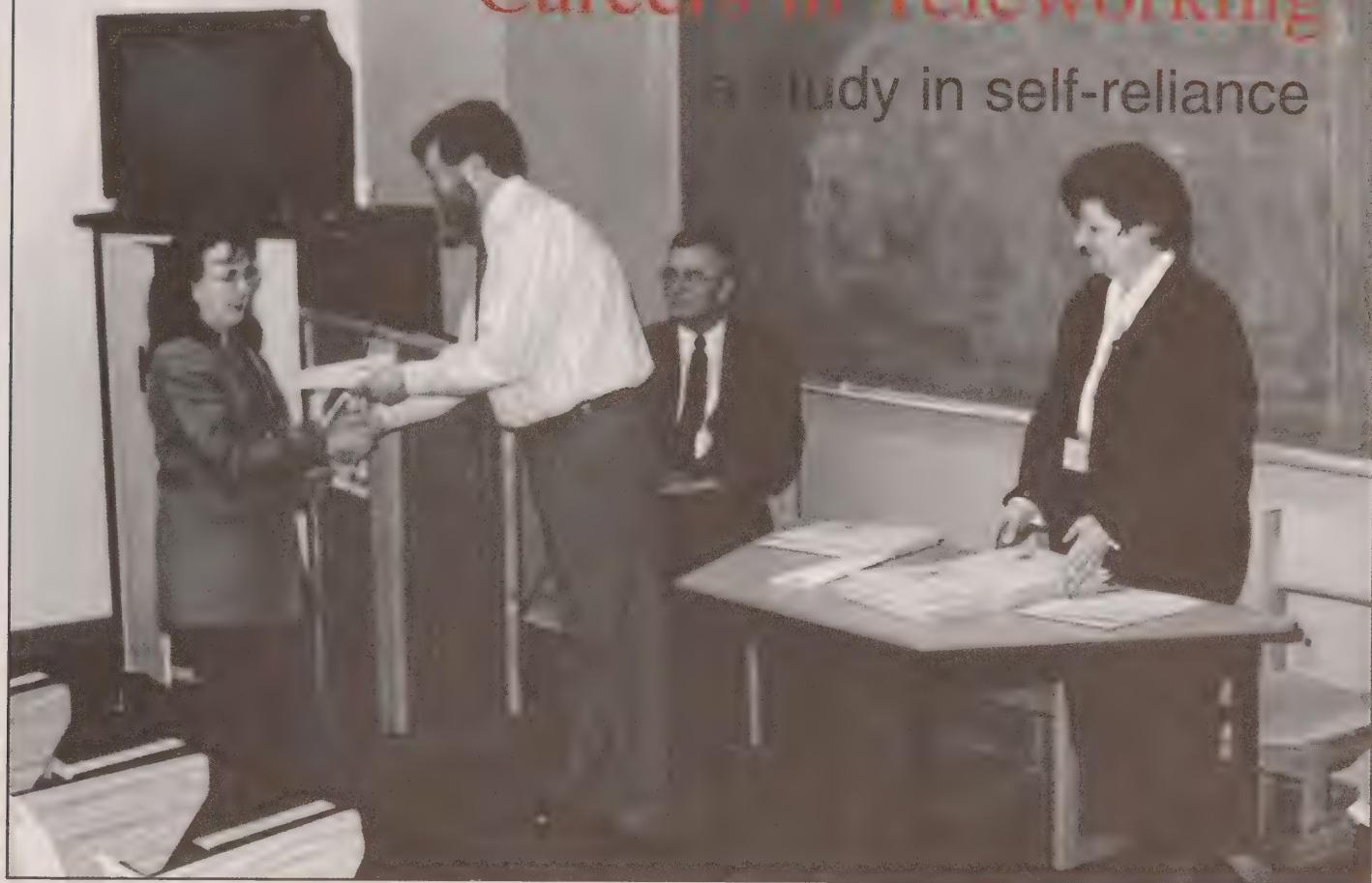
It is hoped that the Enterprise Centre will eventually operate as a stand alone office, taking full advantage of acquired office hardware and software. It is intended that the development and maintenance of this lab will be an ongoing project of Enterprise Education classes. This will further develop the sense of responsibility, independence, and ownership, characteristics that are encouraged in students enroled in Enterprise Education courses at Booth Memorial High School. Ω

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Careers in Teleworking a study in self-reliance



by
Trudi Johnson

Technology in recent years has changed the location of work and the location of learning. These changes are an integral part of the new Teleworking program at the Clarenville campus of the Provincial College. Since January 1996, 27 students have been enrolled in a post-diploma certificate program in Teleworking. They have been tele-learning at home, maintaining communications with their instructors and fellow students through several means. Technologies utilized to deliver this program include: teleconferencing, Internet access, electronic mail and a 1- 800 telephone number.

Graduation from this one-year program was held on January 31, 1997 at the Clarenville campus. All students successfully completed the pro-

gram and are now prepared to be employed as teleworkers using technology-based practices. The Teleworking program trains people to work out of their homes through distance technology. Learning is self-directed and competency-based. The objective of the teleworking program is to produce students who are able to function effectively as employed or self-employed teleworkers using technology-based distance working principles and practices (see *Prospects*, V3, N1, spring 1996).

The Teleworking program included two semesters, with 15 weeks of classes in each semester. Graduates acquired skills in such areas as: database searching, management and design, information processing, records management, homepage

design, computerized accounting, bookkeeping and marketing.

The graduates came from a wide variety of educational backgrounds, ranging from diploma programs to university degrees. They reside in communities throughout eastern Newfoundland. Many graduates had home responsibilities and found that the teleworking program offered an opportunity to balance the responsibilities of a career and a home.

Heather Penney, a graduate, has recently taken on full-time employment as Coordinator of Telematics Services with the Clarenville Telematics Strategy. Penney has two offices, one at Clarenville Campus of the Provincial College and one in her residence in Clarenville. Penney tells how she became involved in the teleworking program. "I completed a clerk accounting program ten years ago. I took time off to have a family and when I decided to return to the workforce, I realized that I would need upgrading, especially in computer skills. That's when I enrolled in the Teleworking program."

Penney explains that she was well aware of the importance of being skilled in the area of information technology if she hoped to find employment. "I've always considered myself a lifelong learner," she says, "and although I was a little intimidated by the technology at first, I was willing to give it a try."

In the program's orientation last year, students were shown how to assemble and disassemble a computer. Then they returned to their homes with their new computers and set them up. The courses were completed at home but students were expected to maintain regular contact with instructors and other students through email and telephone systems.

Research and report writing were a large part of Penney's program. Most of her research was done on the Internet. "Sometimes it was frustrating because of technical problems. When we, as students, wanted to ask questions and get immediate answers, it was not always possi-

ble. We'd have to wait to get an email reply." Heather feels strongly that the program taught her time management skills and skills in independent learning. "Because so much of what we had to do, we did on our own, there was a tremendous sense of accomplishment when each assignment was completed." In one of her courses, Heather was part of a group project. The task was to investigate some implications of setting up a home-based business. Although she worked with fellow students to complete the assignment as required, their only communication was through email. Heather was looking forward to meeting some of her fellow students for the first time at their graduation.

Now in her new position as Coordinator, Penney has the opportunity to put into practice many of the skills that she learned in the Teleworking program. She usually works three days a week at the College and two days in her office at home. She sees the flexible work schedule as one of the greatest assets of the program. "I have fewer distractions at home," she says. "Whenever I have a task that I really need to focus on, I wait to work on it at home." At the same time, she still likes to come into the College during the week. "I need access to the resources found at the office, such as copiers. It's also nice to have more immediate contact with the employer and to exchange ideas with others working in my area."

She points out that teleworking is not for everyone. "It requires people who are flexible and adaptable. There is no point getting frustrated with the technology when it doesn't work the way you want."

Penney's employer, the advisory board of the Telematics Strategy in Clarenville, sees the hiring of a teleworker as an experiment but is optimistic about the potential of hiring teleworkers.

Penney feels there are many advantages to working at home. She sees the home as a more relaxed environment where it is much easier to accomplish tasks. Although she

Heather Penney, a graduate, has recently taken on full-time employment as Coordinator of Telematics Services with the Clarenville Telematics Strategy. Penney has two offices, one at Clarenville Campus of the Provincial College and one in her residence in Clarenville.



Heather Penney in her office at the Clarenville Campus of the Provincial College

has two small children, she quickly points out that she cannot be expected to provide child care when she is supposed to be working. Her family and friends understand that she has specific office hours at home and should not be disturbed.

At the graduation ceremony,

instructor Judy Green praised the commitment and dedication of the students. Stephen Quinton, Campus and Area Director, also commented on the tenacity of the students throughout the program. He encouraged them to follow through on a commitment to establish a Telework

STRAT

Association to maintain contact with other teleworkers throughout the province and to promote the potential of this type of work in many areas of the workplace. Susan Hollett, representing the graduates, cited the assistance of the technical support staff as paramount in helping students complete their courses. Hollett has recently set up her own consulting company in the area.

For students with no previous post-secondary education, there is a two-year program in Teleworking at Clarenville campus. Twenty-four students enroled in that program will graduate in June 1997. College personnel hope that funding will become available to continue this highly successful and innovative program. **Q**

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Penney works from her home office two days of the week.

Crediting Learning: Prior Learning Assessment

by
Trudi Johnson

Learning is a continuous process that occurs formally and informally, inside and outside educational institutions. As more adults return to a formal educational setting for training and upgrading, there is a greater demand for recognition of previous formal and experiential learning. Prior learning assessment offers an opportunity to award credit for learning gained outside the classroom through work experience, community work and independent learning.

The assessment of prior learning to award credit uses a combination of assessment methods including: an examination, interview, performance evaluation, simulation, documentation, or the creation of a portfolio. The learning is measured against predetermined standards such as course learning outcomes. When students receive credit for their prior learning, they are free to focus only on the courses in a program for which they had not gotten sufficient or appropriate learning or training. This may result in a shorter and more cost-effective program for the students.

In 1992, the Department of

Education in Newfoundland and Labrador identified prior learning assessment as valuable for linking the learner to the appropriate post-secondary program. Cabot College implemented the practice as part of a three-year Early Childhood Education pilot project. In 1994, Cabot College developed and implemented a Train the Trainer program in Prior Learning Assessment for public post-secondary institutions throughout the province. (See *Prospects*, V1, N2, fall 1994)

In September 1995, the Council of Higher Education began a two-year initiative for prior learning assessment with public post-secondary institutions throughout Newfoundland and Labrador. The initiative is funded by the COOPERATION Agreement on Human Resource Development. It has three major goals:

- to develop and deliver comprehensive information/training programs ranging from short sessions with support staff to longer sessions with training assessors
- to develop a provincial Prior

- to design and implement a marketing strategy to raise the awareness of PLA in the province

To ensure a wide application of the prior learning assessment program, a team of PLA coordinators has been put in place. They represent the Provincial College system and the Centre for Nursing Studies. Sandra Evans has been seconded to coordinate the initiative at the provincial level while the PLA coordinators have the responsibility of implementation and coordination at the institutional and regional levels. The team members are responsible for training within their own institutions and act as contact persons for PLA programs in their institutions. They also coordinate PLA activities for their sites.

There are two committees governing the PLA initiative. The first is the PLA project coordinating committee that manages the overall implementation of the project. It is chaired by Jim Forward who represents the provincial college system. Other participants on the committee are representatives from Memorial University of Newfoundland, private colleges, Council for Higher Education, the Centre for Nursing Studies, Human Resources Development Canada and the Newfoundland and Labrador Federation of Students.

A second committee, a provincial PLA committee was established in response to interest expressed by many groups during the consultation phase. This committee is also chaired by Jim Forward and includes representatives from the secondary school system and post-secondary institutions, Human Resources Development Canada, community groups, Employers Council, Public Service

Commission and provincial government departments. This committee's mandate is to provide advice on policy direction.

"The success of PLA provincially is dependent upon a willing attitude and acceptance of the process," says Sandra Evans, PLA coordinator. "All partners must be committed to full participation." She argues that defining policies and ensuring standards are absolutely necessary to be fair to students and to provide faculty members with appropriate guidelines. "PLA in some instances is regarded as a separate entity outside mainstream educational practices," says Evans. "It should be seen as a facilitating opportunity and very much an integral part of the educational experience."

To be carried out effectively, the prior learning assessment process requires dedication and commitment to a student-centred approach. It is an individualized service often requiring one-to-one instructor/student participation and consultation. PLA personnel provide a variety of information and training programs, ranging from basic training sessions for support staff (for example, those who work in student services) to broader, hands-on training sessions for instructors in areas where they need information. Sessions focus on the use of a variety of methods of prior learning assessment and portfolio development. The golden rule of PLA is "crediting learning."

In this second year of the two-year initiative the team of PLA coordinators hopes to establish partnerships with the workplace to explore other applications of PLA. For example, PLA can focus on the human resource development requirements of individuals in the workplace. This would help employees to avoid enrolling in courses they do not need. The workplace benefits because employees are gone only for the time necessary



*PLA Coordinators Committee (left to right): Joanne O'Leary, Geoff Kelly, Brent Howell, Sandra Evans, Ruth Benson, Walter Smith
(missing from photo: Madge Applin, Wayne White)*

to upgrade.

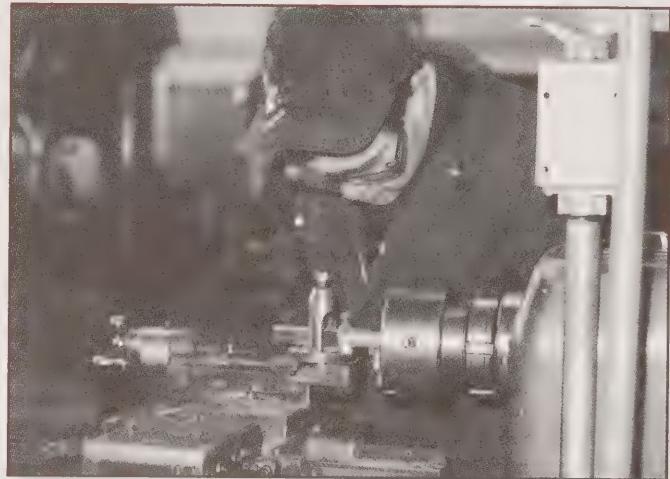
Prior Learning Assessment has several benefits for students and the community. For the educational institutions, Prior Learning Assessment can lead to increased enrolment beyond the first semester or year of programs because some students can receive credit for some or all of the required courses, and complete any that are needed through part-time studies. Thus, these students can bypass long waiting lists into first year and enter into second year or beyond where numbers are often decreased due to attrition. More appropriate placement of students results in more efficient use of resources and cost-effective programs. Students avoid the expense of completing courses that they do not need. In addition, the recognition of non-credit learning builds students' self-esteem and confidence and helps them identify their strengths. Prior Learning Assessment encourages cooperation between educational institutions and promotes partnerships between industry and

education. Ω

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National Standards for Trades Training



improved labour mobility, workforce competitiveness and enhanced employability options for Newfoundland and Labrador students and workers

by
Ray Kavanagh

A highly skilled and mobile workforce is vital to meet the challenge of global economic competitiveness. Competition for jobs is very keen in Canada and this trend will continue as the future of work and jobs is being created by technology and changing demographics. More than ever before, workers are challenged to be mobile and to create self-employment as an alternative to a paid job. Canada has an ageing population, a low rate of economic growth, and variations in its provincial economies. At the same time, several developing countries have a young population and rapid economic growth. Students and workers who are mobile have the greatest possibility of gainful employment in this environment. The recognition of qualifications across jurisdictions is becoming increasingly important to the enhancement of worker mobility.

Adherence to training standards produces the strongest argument for recognition of qualifications to enhance worker mobility.

The concept of worker mobility is nothing new to Newfoundlanders and Labradorians who have a history of travelling and often relocating to other parts of Canada and the world in search of work if they cannot find jobs at home. For example, the majority of the people in communities such as Cambridge, Ontario and Fort McMurray, Alberta are originally from this province. Many others are employed in Nova Scotia and British Columbia.

The rationale for this study is based, in part, on the fact that the greatest number of people leaving Newfoundland are young people from 15 to 35 years of age. In addition to out migration to other provinces, a growing number of Newfoundlanders

and Labradorians are moving to international job opportunities such as teaching English as a Second Language in Korea and Japan. The oil industry and the marine fabrication industries have introduced many job seekers from our province to international employment opportunities particularly in Norway and Scotland. In many cases, the education and training that they obtain before leaving the province have served them well. Many of the instructors in Newfoundland and Labrador colleges can account for former graduates who are gainfully employed across Canada, many in leadership positions. The National Standards-Trades project compares the quality and relevance of selected training programs with similar programs in the provinces where the majority of Newfoundlanders have relocated.

The National Standards-Trades project contributes to the goal of Canada-wide recognition of the qualifications obtained through completion of entry level trades and occupational programs in Newfoundland without resorting to additional testing, assessment or training. The purpose of the project is to contribute to this goal by linking provincial trades and occupational training curriculum with the curriculum in other provinces and existing national occupational standards. The critical questions are: (a) Is the training provided to students and workers trained in Newfoundland equivalent to the training provided in other provinces? (b) What are the elements of an accreditation process that would ensure minimum standards across all entry level training in Newfoundland and other Canadian provinces, and how could it be implemented? (c) Are qualifications that represent "Canadian" standards rather than "provincial" standards more likely to be recognized elsewhere in the world?

The scope of the study includes a review of several entry level training programs including one-year certificate programs in the apprenticeable trades of Carpentry, Motor Vehicle Repair, Electrical and Welding, and occupational training programs in Aquaculture and Information Processing. In addition to Newfoundland, the provinces included in the study are Nova Scotia, Ontario, Alberta and British Columbia. In Nova Scotia, the Nova Scotia Community College Headquarters and three of the campuses are participants. In Ontario, Alberta and British Columbia, three colleges per province is the target level of participation. The mandate of our new Provincial College has an international dimension. Where possible, colleges that are active in international student recruitment are selected.

The methodology employs a review of data from primary and secondary sources. The review includes existing work on national standards by the Canadian Labour Force Development Board, the Association of Canadian Community Colleges, the Canadian Council of Directors of Apprenticeship, the Canadian Interprovincial Red Seal program and site visits to participating colleges in other provinces. The indicators that are used in this study for comparative analysis of the selected trades and occupational programs include the criteria used by the Canadian Technology Accreditation Board to review technical and technology programs. The main indicators are: academic entry requirements; program objectives; curriculum criteria; duration of training; qualifications of instructional staff; professional development policy; instructional facilities; relevance to business and industry needs; advisory committee structure and membership; existing standards

for successful completion; regional variance; graduate employment; business and industry participation in the delivery and evaluation of training.

The planned outputs of the study include a status report on selected programs in Newfoundland and Labrador compared with similar programs in other provinces and recommendations towards achieving national standards. The outcome and impact of the study will be determined by how that study is used to benefit students and workers, training providers and society generally. The potential benefits include the identification of a framework for accreditation of trades and occupation training as a strategy to improve labour mobility and workforce competitiveness provincially, nationally and globally. In addition, the positive impact of linking provincial curricula to that of other provinces is enhanced employability options for students and workers and the promotion of human resource development in the province.

This article presents the context of the study in terms of national and provincial issues affecting national training standards and the ability of students and workers to harvest the opportunities that are emerging in the global economy. The eastern region of the Provincial College is conducting the study on behalf of the Department of Education with funding provided under the Canada-Newfoundland COOPERATION Agreement on Human Resource Development. The National Standards-Trades study should be completed by May 1997.

THE CONTEXT

If the implementation of national standards for trades and occupational training would improve mobility and competitiveness of the workforce plus enhance employability options for workers within Canada and globally,



Students enrolled in the welding program at the Provincial College, St. John's Campus, hone their skills in the welding shop.

then why has this not happened? The Canadian Constitution awards jurisdiction over education and training to the provinces. Canada does not have a national system of education and training and national standards. Furthermore, provincial governments are protective of their jurisdiction over education and training. Thus, the government of Canada has neither the constitutional grounds nor the necessary demand and support of provincial governments for standardized education and training on a national level.

The absence of a constitutionally established national system of education and training presents a challenge to governments, educators and other stakeholders to develop a national training strategy and establish national standards to increase worker mobility. It should be noted that the Canadian Council of Directors of Apprenticeship is currently involved in several initiatives related to national standards in interprovincially designated occupations. Labour mobility is a critical component of efforts to position our students and

workers to harvest opportunities in the global economy. The inherent characteristics of labour mobility include minimum standards governing knowledge, skills and attitudes combined with national and international accreditation of education and training programs.

Although the federal government is constitutionally excluded from the field of education and training, it has traditionally played a major role in labour force development by providing funding to the provinces and territories for post-secondary education and training, and by purchasing training from public colleges and institutes and private training providers. However, each province and territory has mandated its post-secondary system to give priority to the delivery of programs that meet the training needs of local and provincial employers in the various business and industry sectors. The education and training programs offered by public and private training providers are subject to approval by provincial authorities. Traditionally, the emphasis is placed exclusively on local and provincial

labour markets. However, the impact of the global economy and the international dimension of our new College's mandate are forces that will produce curriculum revision to reflect national and international standards.

The funding transferred by the federal government to the provinces for post-secondary education is declining rapidly. Provinces are reacting to this in different ways, many by restructuring and downsizing their post-secondary systems. Saskatchewan has taken the approach of shielding its post-secondary system from reduced federal funding while redesigning the system based on priorities determined through a process of consultation with the people of their province. Newfoundland has restructured its system of five regional colleges to establish one provincial college organized into seven districts. These are timely approaches because in addition to reducing funding the government of Canada recently indicated its intention to transfer full responsibility to the provinces for labour market training.

The concept of a national system of education and training is not congruent with the reality of twelve distinct systems across Canada. Nonetheless, the challenge to create a "Canadian" workforce that is globally competitive is becoming increasingly urgent as the financial centre of the world shifts to the Asia Pacific region where the economies of several countries are growing rapidly. The absence of a Canadian national system to create a single window for marketing education products and services has handicapped efforts of Canadian colleges and institutes which are trying to develop export markets for their education and training products, and services. In the international marketplace, Canadian colleges are competing with each other in addition to competing with the national systems

of countries such as Australia, Germany and Japan.

The need for national skills training standards has never been greater. The mobility of students and workers on interprovincial and global levels is enhanced by processes to license, certify or register workers according to national standards. In the absence of national standards some alternative approaches have been developed. For example, the certification of tradespersons under the Canadian Interprovincial Standards Red Seal program achieves the principle of national standards through an interprovincial agreement. According to the agreement, participating provinces and territories jointly develop standardized examinations and recognize Journeypersons holding a Certificate of Qualification with the Interprovincial Red Seal. Likewise, the national accreditation of technician and technologist training programs by the Canadian Technology Accreditation Board (CTAB) enhances the mobility of graduates. Graduates of programs accredited by CTAB are eligible for membership in affiliated provincial professional associations and thus are recognized in participating provinces without further testing, assessment or training. The Information Technology Program that is offered in Ontario, Manitoba and British Columbia with national certification of graduates by the Software Human Resources Council is a recent example of an innovative approach to establishing national standards. This was accomplished through collaboration with business and industry partners who played the lead role in developing the skill standards and credentials.

This study, which is an initiative of the Department of Education, represents just one small step towards achieving national standards by comparing a sample of trades and occupa-



Students enrolled in the automotive program at the Provincial College, St. John's campus, practise their skills in a modern automotive facility.

tional programs in Newfoundland to similar programs in four other Canadian provinces. The study is aimed at the micro level of enhancing mobility through recognition of qualifications earned by students and workers in entry level programs in Newfoundland and Labrador. However, a workforce is created one worker at a time. The early findings in this study confirm that a system of national training standards would provide a common language to improve communications among employers, governments, and educational institutions regarding the skills requirements of a globally competitive workforce. Upon completion, this study will recommend ways to address these challenges that are consistent with the stated goal, purpose and scope of the study. Ω

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Operating Engineers: Learning Through the Work Environment

Project Profile

Although technological advances are affecting all occupations, most workers often require only a minimum upgrade to become proficient. A new strategy to train workers and improve their employability skills while in the workplace has been developed by Operating Engineers in the province. The focus of the "Workplace Integrated Skills Program" is to provide learning in the work environment.

Operating Engineers Education and Development Inc. (OEEDI) was established by the International Union of Operating Engineers (IUOE), Local 904, in the early 1990s. The purpose is to address the training needs of its membership, particularly construction industry members in Newfoundland and Labrador. It has focused primarily on promoting safety in training and providing its members with up-to-date information on technology and equipment.

There are approximately 800 members of the Operating Engineers industry in the province, working in such areas as tower and mobile cranes, heavy equipment operation, welding, concrete and asphalt mak-

ing, slip forming, paving, marine work, diving, clerical, engineering and drafting, and industrial quarry operation. Training for crane and heavy equipment, and other occupations has been provided at various locations throughout the province but most recently the OEEDI has focused on the potential for apprenticeship and occupational programs at its training facility in Holyrood.

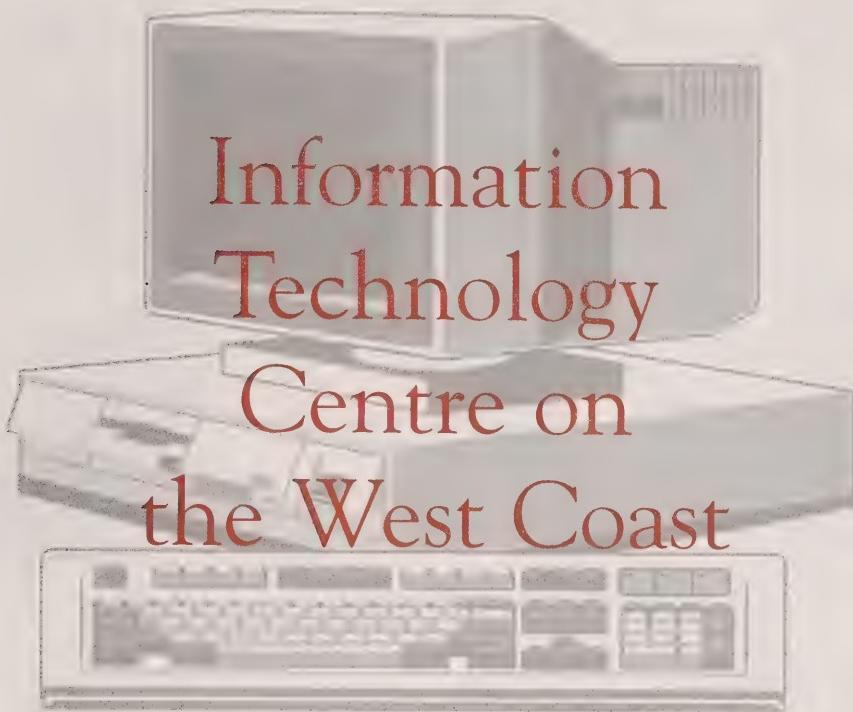
The "Workplace Integrated Skills Program" is the result of the recommendations contained in a "Report on Basic Needs Assessment" conducted in 1995. The major recommendation was an overall campaign to improve the numeracy, reading and writing levels of operating engineers by integrating the upgrading of basic skills into trades training and employment opportunities. It is the basis of a Pre-operational campaign, a collective effort of industry, government and the union. The Pre-operational campaign pilots a limited numeracy and reading curriculum with appropriate occupational and workplace themes. Training materials are being developed specifically for the workplace, using workplace examples. A

coordinator has been working for 12 months to implement the program and now the program is being incorporated into the trades training at OEEDI. Operating Engineers and the community will greatly benefit from the new workplace program. The result will be better trained and more employable members equipped to handle the challenges of change within their respective occupations. Ω

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Project Profile



One of the more prominent changes in education in recent years has been the integration of information technology into educational pedagogy. While most secondary and post-secondary institutions do not have the resources to provide opportunities for training in this area to their instructors in their own individual institutions, some have found the needed training facilities by combining their efforts and resources. A current example of such a collaborative effort is occurring on the west coast of the province.

In January 1995, a group of educators in the region examined the need for a centre to provide training and educational opportunities tailored to the integration of information technology into education. The committee focused on two objectives: to provide training in the use of information technology and to promote attitudinal change to encourage and promote the use of information tech-

nology in the classroom.

A partnership was formed to work towards these goals. The group consisted of two post-secondary institutions, Sir Wilfred Grenfell College and WestViking Institute of Applied Arts and Technology, Corner Brook Campus, and two former school boards, the Western Integrated School and the Humber-St. Barbe Roman Catholic School Board.

With the assistance of the COOPERATION Agreement on Human Resource Development, an Information Technology Centre is being established at G.A. Mercer Junior High School in Corner Brook. This project is designed to provide in-house training and educational opportunities for K to 12 teachers and faculty and academic support staff in post-secondary institutions. There are approximately 1575 K to 12 teachers and 450 university professors and community college instructors in the West Coast region.

The facility will consist of a computerized training laboratory and a smaller research and development laboratory. The laboratories will be networked for local use and connected to a terminal server and router for Internet access.

The centre is currently in Phase I of its implementation. Initially, the facility will provide the computer hardware necessary to train K to 12 educators in the use of information technology, the Internet and resource utilization. It is also envisioned that this site will be used for general and specialized training, such as courseware development, software programming for post secondary faculty, instructors and academic support staff. In addition to on-site training, it is hoped that the centre will provide training and professional development opportunities by distance through online courses. Ω

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Memorial University of Newfoundland Announces a New Business Degree



Students interested in pursuing business education at Memorial University have just been given another option. In addition to the existing bachelor of commerce (general, co-operative, and honours) and diploma and certificate programs, the Faculty of Business Administration will offer a bachelor of business administration (BBA).

Gary Gorman, associate dean of Memorial's undergraduate business programs, said the new degree fills a gap that has existed at the Faculty of Business Administration for some time. "First of all, this is an attempt to respond to increased demand for undergraduate business education while at the same time answering the needs of students who want an undergraduate business degree but who do not necessarily have or want work experience as the existing program requires."

Gorman said that, until now, students either had to apply to the five-year co-op program, which has a rigid course structure and includes three work terms, or they had to meet the

work experience requirements of the general bachelor of commerce and diploma programs. The new BBA is a four-year program with a more flexible course structure and no work term component or work experience requirement.

One of the main features of the BBA program is the blend of business and non-business courses, and the option to do a minor in a non-business area, such as arts or science. Another feature of the program is the option to do a significant portion of the courses by distance. Gorman said students should easily be able to choose from Memorial's distance education offerings to complete their electives and they can also do most of the core courses by distance. He said the faculty plans to make all courses available via distance technology within the next year or two.

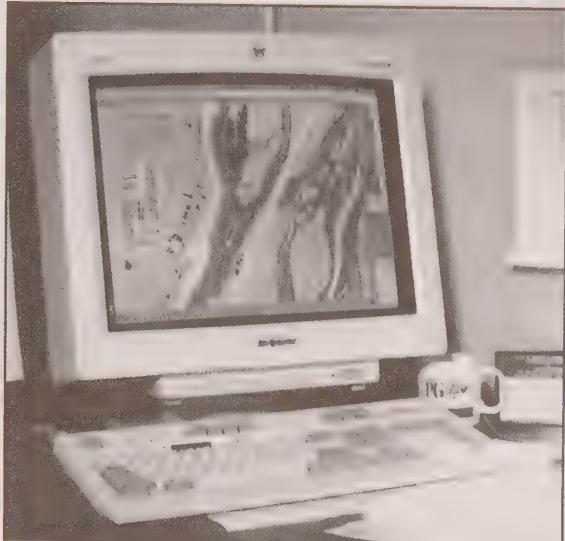
Demand for the limited number of seats available in the new BBA program is expected to be high. In addition to providing an alternative for students who have not been accepted into the commerce co-op

program, (limitations on work term placements mean only 200 of the average 350-400 applications get accepted) Gorman said the faculty expects to hear from a new group of students who have not traditionally considered a business degree at Memorial.

These groups include students from outside St. John's (including foreign students) who like the less-expensive nature of the shorter program and distance education capability; students who know they want to do graduate work and do not require work term experience; and graduates of community college business programs.

To learn more about Memorial's bachelor of business administration, contact the Faculty of Business Administration at Memorial University of Newfoundland at (709) 737 - 8853 or visit their homepage at <http://www.mun.ca/business>. Ω

Shift Work For Electronic Data Production



a local company takes advantage of technology and research to find a better way to work

by
John Kennedy

The increasing processing power of personal computers has resulted in the development of personal computer-based navigation systems that are very affordable. These systems are experiencing growing worldwide popularity which has, in turn, resulted in increasing demand for navigation charts in electronic format. Nautical Data International, Inc. (NDI), a Newfoundland-based company, was established to become a worldwide producer and distributor of these Electronic Navigation Charts (ENCs). NDI currently has over 35 people who are directly involved in production of ENCs. This type of electronic data production has provided some interesting challenges and insights into establishing a viable scheme for hours of work in the production department.

Conversion of traditional paper charts into electronic form is a time consuming task that is accomplished

by scanning the source mylar copy of the chart and then performing a variety of conversion processes at a computer terminal. This work requires a high level of concentration for extended periods of time, all at the confines of a computer workstation. Since the final product is used in support of navigation, mistakes or errors in the final product are unacceptable, and could have life threatening consequences. Obviously concentration throughout the entire process is of vital importance.

The production of this product however, is no different from the production of any other product; therefore, maximizing production equipment productivity is of key importance. Since this work is accomplished on computers, which are tireless 24 hours per day 7 days per week, equipment productivity is maximized by operating these systems continuously. This, however, is not possible for the human operator; therefore,



Staff at NDI's vector work stations working during the day shift

some form of shift work must be implemented to maximize equipment productivity.

The initial shift scheme was a five days per week, 24 hours per day arrangement split between three 8 hour shifts (08:00 - 16:00, 16:00 - 00:00, 00:00 - 08:00). The groups rotated each week between day/evening/night shift; one week on days, one week on evenings and one week on nights and then repeated the cycle. However, a major productivity problem was identified with the night shift (00:00 - 08:00). Personnel were unable to maintain their concentration, especially between the hours of 03:00 and 06:00.

Investigation was undertaken through a variety of sources and it was unanimously identified that the "graveyard shift" (00:00 - 08:00) is very difficult on the human body. During these hours the body's internal clock tries to induce sleep as part of the defense mechanism to ensure some measure of rest and rejuvenation that occurs during sleep. The body takes a variety of cues in setting

its internal cycle. Studies have shown that it is possible to "over-ride" some of these cues, such as the visual day/night factor, by carefully adjusting other cues such as timing of eating, exercising and sleeping habits. These cues, however, cannot be adjusted overnight but require three to six days of the revised pattern before the body has fully acclimated to the new pattern.

Thus, this investigation identified that the one week rotation period, which included one week of night shift, provided insufficient time to allow the body to acclimate to the graveyard shift. Not only was the week on night shift a period of low productivity but also some portion of the week after the night shift week was also at risk. In a production environment that demands continuous uninterrupted concentration with little or no movement around the work area, the tiring effects of mental concentration are amplified by the physical strain of cycling through the night shift. This equates into a highly unproductive group that is subject to

increased error rates due to the physical tiring and resultant inability to maintain extended periods of concentration.

As a result of this investigation, the three group rotation over five 24 hour days scheme was replaced with a seven day two shifts per day scheme that cycles three groups through day and evening shifts. The new scheme gives two days off time for every three days or evenings worked and avoids production during the high risk time-frame from 03:00 - 06:00. Since implementation of the new scheme, productivity across shifts has approached a more matched ratio. Ω

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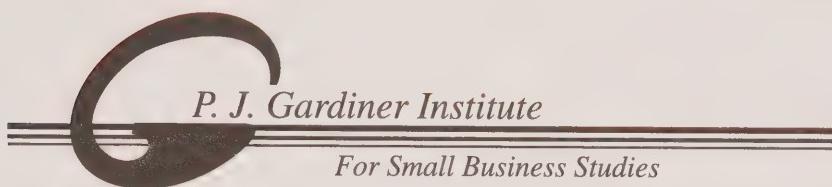
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Managing Business: What Every Small Business Manager Needs to Know But Doesn't Have Time to Ask



by
Shari Costello

Are you a business owner who needs to know more about surviving in the new economy? If so, there are several key areas you should be aware of. With so much emphasis on the small business sector as an important contributor to the growth in employment and job creation in Newfoundland and Labrador, the long-term survival of your business is very important.

Growth in the small business sector has not only strengthened the economy but has presented challenges for a number of entrepreneurs. Small business is defined in Canada as firms employing fewer than 50 people in the service sector and fewer than 100 people in the manufacturing sector. According to a report published by the Atlantic Canada Opportunities Agency in 1996, from 1994 to 1995, enterprises with less than 50 employees created 78 percent of the net new jobs in Atlantic Canada. The report also stated that "small firms create more jobs and lose less in relative terms than firms in the medium to large size categories." In

Newfoundland and Labrador the number of new venture start-ups is growing at a rate of approximately 25.8 percent annually.

Starting a new business can be very demanding and requires a great deal of energy and know-how. Many government agencies, business organizations, and financial institutions assist in the development of small business by providing several programs, services and financial support in the start-up stage. However, the real challenge in new venture start-up is the long-term survival and growth of the business. Most studies reveal that approximately 50 percent of all small businesses fail within the first three years of operation and one out of three business start-ups will close within six months.

The most important function to the success of any business is planning. A well-developed business plan is the most important document an entrepreneur will have in starting and operating a small business. A business plan organizes and describes all aspects of the business venture and

provides a framework in which performance can be effectively measured as the business grows. It outlines information on the product and service to be offered, potential customers, the competition, marketing research, management team, operations plan, human resource requirements and forecasted financial plan. Not only is the business plan used for attracting financial support but it is also used for internal evaluation after the business has started. It is also continually revised and updated as the business changes and grows. It is the road map to success!

In the majority of cases, the biggest obstacles entrepreneurs face when operating a small business include managerial problems, inadequate financial support and lack of market knowledge.

Market information is very important in all stages of the business as it identifies the direction which the business will take. A business owner needs to recognize the unique qualities of its product or service, which customer groups will be targeted, who are the major competitors, and market characteristics such as industry trends. Many entrepreneurs launch new ventures without the proper market research and analysis and overestimate the sales and market potential of the business. Marketing lays the foundation for new venture success!

Poor management is another factor contributing to the failure of many small business ventures. Lack of management experience, including human resource management and internal financial management, are dominant problems in the growth stage of a business venture. The entrepreneur is not only running the day-to-day operations of the business but is also involved in a wide array of business activities. Obviously, this creates time constraints and demands on the entrepreneur and the business

operation. If not identified and resolved early, management may find it hard to overcome these problems throughout the development of the business. Human resources are an important asset to business success!

It is also important for small businesses to have adequate financial resources to assist in the future growth and development of the business. Most businesses fail due to financial problems such as inadequate working capital, cash flow problems and increased debt financing. Undercapitalization is a big problem among small businesses where too much debt is obtained too early and an overly optimistic estimate of revenue is projected. In most cases, the start-up or expansion phase is when financial support is most predominant. However, financial institutions, organizations and federal and provincial departments are readily available for advice and support. According to the Canadian Bankers Association, 80 percent of business loan customers are small business owners. Financial statements are the most powerful tool in deciding the success of a business.

To overcome some of the difficulties that arise in the development stages of a small business, the following are several tips for managing a small business:

- Investigate the economic conditions surrounding your small business activity such as industry trends and competition.
- Conduct extensive market research prior to starting up your business and continue gathering information throughout the life of the business.
- Prepare a detailed business plan so you will not lose sight of your goals and objectives.
- Secure sufficient financial resources

for future development or expansion.

- Contact professional advisors such as an accountant, banker and/or lawyer to provide expert information about your business.
- Network with other small business people; establish a support group. Remember, you are not alone.
- Attend workshops, trade shows, and seminars to keep up-to-date on changes in the industry.
- Adopt a team approach; work with others in pursuing common goals.
- Understand the skills and qualities you bring to your business.
- Develop a situation analysis of your company including its strengths, weaknesses, opportunities and threats to assist in the development of a strategic plan for the future of the business. Ω

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Third International Mathematics and Science Study



Newfoundland and Labrador students perform well in the latest study on skills in mathematics and science

In November 1996, the International Association for the Evaluation of Educational Achievement released the results of the Third International Mathematics and Science Study (TIMSS). The Association includes universities, research institutes and ministries of education that conduct cooperative international studies in education.

Forty-one countries participated in the mathematics and science tests. The first report focused on students in Grade 8 (13 year-olds) or its equivalent internationally. This is the highest grade level in most countries in which most young people are still in school and studying mathematics and science. Approximately 500,000 students in more than 15,000 schools participated in the study worldwide. All students wrote a 90-minute test in mathematics and science and responded to a questionnaire about

their opinions, attitudes, and interests. The achievement items used in the tests were compiled through a consensus-building process internationally. The tests included multiple-choice items as well as short answer and extended response items.

The TIMSS mathematics test consisted of 151 items developed for the study and extensively field-tested. Over 90 percent of the items were matched to the curriculum of Canadian schools. The TIMSS science test consisted of 135 items, of which over 80 percent were considered suitable for Canadian students.

Teachers also completed questionnaires about their academic and professional preparation, instructional approaches and the curriculum. Administrators provided information about schools, students, and teachers. Students completed the mathematics and science tests in the spring of

1995. Some Canadian and international results and comparisons follow:

MATHEMATICS

- Internationally, the average score on the mathematics test was 55 percent.
- Canadian Grade 8 students (the sample included 17,000 students from Grades 7 and 8) had an average score of 59 percent. There was considerable variability across countries on the mathematics test, with scores ranging from a low of 24 percent in South Africa to a high of 79 percent in Singapore.
- Canadian students did as well or better than students from 30 other countries and not as well as those from 10 countries.
- Canadian students had scores sig-

nificantly better than the international average in four mathematics content areas: fractions and number sense; geometry; data representation, analysis and probability; and proportionality.

- Canadian students indicated positive attitudes towards mathematics, with 74 percent reporting that they enjoy learning mathematics.

SCIENCE

- Internationally the score on the science test was 56 percent.
- Canadian Grade 8 students had an average of 59 percent on the science test.
- There was less variability in science scores across countries than in mathematics. Scores ranged from a low of 27 percent in South Africa to a high of 70 percent in Singapore.
- Canadian students did as well as or better than students in 31 countries.
- Canadian students performed better than the international average in four of the five science content areas: earth science; life science; physics; and the environment and the nature of science. The Canadian result in chemistry was the same as the international average.
- Sixty-eight percent of Canadian students reported a positive attitude towards science.
- Canadian boys and girls performed equally well in mathematics and science which represents a significant change over the past 20 years.

Seventy-five percent of mathe-

matics teachers and 68 percent of science teachers in Canada reported that Grade 8 students have access to calculators although reported usage rates were somewhat lower. Although there are many computers in Canadian schools, they are rarely used for mathematics and science instruction in Grade 8. Over 80 percent of mathematics teachers reported that they never or almost never use computers in their teaching.

For the first time in an international study, Canada was represented by a national sample of schools, including private, public, separate, English and French-speaking. Five provinces, British Columbia, Alberta, Ontario, New Brunswick and Newfoundland selected samples large enough to make interprovincial comparisons possible. In Newfoundland and Labrador, 733 Grade 7 and 8 students in 39 schools participated. Some Newfoundland results and comparisons follow:

MATHEMATICS

- Newfoundland and Labrador students had a average score of 56 percent in mathematics, which is slightly higher than the international mean of 55%.
- Newfoundland results were ahead of the provinces of Ontario and New Brunswick but lower than the provinces of British Columbia and Alberta. Newfoundland was also ahead of Australia, United States, Germany, New Zealand, Ireland, Scotland and England.
- Achievement in mathematics in fraction and number sense, algebra, data analysis, and proportionality is higher among Newfoundland students than the international scores. Newfoundland scores are lower than the international mean in geometry and measurement.

SCIENCE

- In science, Newfoundland students scored the same as the overall Canadian average, with a result of 59 percent. This is higher than the international mean score of 56%.
- Newfoundland students scored higher than their counterparts in Ontario and New Brunswick, but lower than students in British Columbia and Alberta. Achievement in Earth Science, Life Science, Physics, and the Environment and the Nature of Science is higher among Newfoundland students than the international result.
- In environment and the nature of science, Newfoundland students performed higher than Canadian students as a whole.

In recent years, a number of government programs such as the COOPERATION Agreement on Human Resource Development have fostered projects that emphasize achievement in mathematics and science. The results show that there has been a marked improvement in achievement in science and mathematics among Newfoundland and Labrador students since the last international testing was conducted in 1991. Ω

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The Second Round Table on Virtual Learning

intranets and internets for teaching and learning

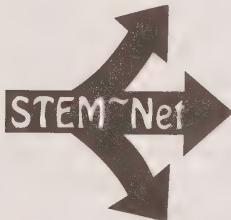
by
Albert Johnson

The second in a series of round tables being held in Newfoundland and Labrador on virtual learning brought together educators from the K to 12 and post-secondary education systems (for information on the first round table, see *Prospects*, V3, N3, fall 1996, and at the STEM~Net web site at <http://www.stemnet.nf.ca/Conferences/rtovl>). The group met on November 8, 1996 at the G.A. Hickman building in the Faculty of Education at Memorial University of Newfoundland. The second round table was motivated by a set of assumptions that included:

- Growth in Intranet and Internet use for teaching and learning will be exponential in all public education and training sectors.
- There are significant support and public funding issues associated with this growth.
- There will be growth in the num-

ber, size and offerings of private educational institutions, and in their availability on the Internet.

- Public institutions across Canada (and the World) are increasingly using the Internet as a medium for distance education. This growth is likely to be exponential.
- Post-secondary students will register for courses and programs weighing factors of quality, convenience and cost. Geography (or distance) is a reduced factor in virtual environments.
- School boards and schools will weigh factors of quality, convenience and cost in selecting and delivering courses and materials in the K to 12 sector.
- The distinction between on-campus and off-campus students will become increasingly blurred in many courses and programs.
- The private sector will play a major role in courseware development and delivery.



The goals of the second round table included:

- the improvement of communications among the educational sectors
- the sharing of knowledge of environments, tools, courses and programs
- the identification of trends and directions to advise administrators and leaders on needed support
- the facilitation of partnership and collaboration for courseware development and delivery using Intranets and the Internet

The second round table was divided into three sessions: environments and tools, courses and programs and support and other issues. The first session included presentations by Paul Gillard, Rod Byrne and Rick Collins. Paul Gillard, a professor in the computer science department of Memorial University, was the first speaker and presented information about using the Internet as an environment for the delivery of courses and course information. Gillard pointed out that courses are being adapted for web-based delivery. Sites on the Internet are also being used to supplement courses offered on campus. Course notes and laboratory exercises for Computer Science 1700, for example, are available at the course site. Students can work through the exercises online and have their work evaluated electronically. The Hyper Text Markup Language (html) editors and other software needed to develop sites for this environment are readily available on the WWW. Gillard pointed out that much of the software needed to produce material for the web can be downloaded free of charge.

Rod Byrne, also from the computer science department at Memorial University, discussed the significance of Java, a computer language that per-

mits the downloading of executable content on the WWW. The executable content is downloaded as simple applications called applets. So far, these applets have been used to create animations or provide decorative enhancements to web pages. The programming language has also been used to create custom media viewers and custom data entry processes. The language is being used to create larger applications such as office suites for word processing. Byrne pointed out that this method of application development has several advantages. Programs developed with Java can run on PCs, Macs or Unix based computers because the web browser, programs like Netscape and Microsoft Explorer, acts as a virtual machine and operating system. This method is also very secure and limits the possibility of losing data because of problems caused by computer viruses.

Rick Collins, from the Division of Educational Technology at Memorial University, was the third presenter of the first session. Collins outlined the recent advances that have been made in the quality of video and audio presented on the WWW. Collins indicated that the greatest gains have been made in the quality of the video and audio offered on the web and in the quality of software offered to facilitate video and audio communications via the WWW.

The second session of the round table dealt with courses and programs available on the WWW. Michael Collins, a professor in the biology department at Memorial University, offered a summary of his experiences with offering a course on the Internet. Biology 2040, Modern Biology and Human Society, was offered for the first time on the web during the spring semester of 1996. Collins pointed out that the course was well received despite some startup difficulties. The student response to the

method of delivery was very positive. They appreciated the flexibility of doing the course in web format and enjoyed the interaction afforded by email.

Hans Rollman, a professor in the religious studies department of Memorial University, was the second speaker of the session. He demonstrated a web site he had prepared to offer primary resources relevant to religious studies over the WWW. The web site is well developed and user friendly, and is a good illustration of effective use of the web for the delivery of resources in the humanities. Frank Shapleigh of STEM~Net and Leon Cooper from the Department of Education made the final presentation of the second session. They described the East/West Project, a partnership among the provinces of British Columbia, Alberta, New Brunswick and Newfoundland, founded to develop programs in information technology. They also demonstrated a web site created to deliver a course in graphic design to high school students in the provinces involved in the project.

The third session focused on issues of support and policy created by use of the WWW as an environment for the delivery of educational services. Jaap Tuinman, vice-president, academic, of Memorial University, was the first speaker. He argued that course and program content does not define pedagogy. How content and pedagogical issues are going to be resolved as resources move to the WWW is a concern. Copyright and intellectual ownership, remuneration, funding, the learner and evaluating outcomes were issues that Tuinman highlighted in his presentation. He feels that the appropriate application of technology to education delivery systems offers a way to return to working with students as individuals.

Harvey Weir, director of

STEM~Net was the second speaker of the session. Weir directed his comments to the issue of the capacity of technology to meet the requirements of students with special needs in the K to 12 system. Technology offers an opportunity to address the needs of students with disabilities and to challenge the potential of students with exceptional capabilities. Weir pointed out that small schools will be enhancing their programs for advanced students with the distance delivery of advance placement courses.

Doreen Whalen was the final speaker of the session. Whalen focused her remarks on administrative concerns such as the issues of copyright and intellectual property.

The discussion offered at the end of each session dealt mainly with the changing role of educators and educational institutions in light of the technological changes that are occurring. The role of teachers, expectations on students and the culture of our educational institutions are being affected by the new environment. Participants agreed that more discussion and investigation are needed in order to set a clear course into the new world that the Internet is providing. The round table series continued on February 24, 25 and 26, 1997 at Memorial University of Newfoundland. Ω

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Newfoundland and Labrador's First Heritage Fair

by Don Beaubier

Here is your chance to excite your students about Canadian heritage and have fun too! You may even have the chance to travel to Kingston, Ontario with your students to share your project with others from across Canada.

Some of you may have already heard about the Charles R. Bronffman Foundation's National Heritage Fair program. The Heritage Fair is a multimedia education program developed to increase awareness and interest in Canadian history. It is an annual event that involves young people, schools, businesses, and community organizations in a contemporary celebration of Canada's shared traditions and history.

We are pleased to announce that the program has now moved into our province. The first Heritage Fair will take place on May 23 and 24, 1997 at the Marine Institute in St. John's. The Fair is supported by the Department of Education, the Newfoundland and Labrador Teachers' Association Social Studies Council, the St. John's Cabot 500 Foundation Committee and the Heritage Foundation of Newfoundland and Labrador, all of

which are represented on the Steering Committee along with other community volunteers. Leslie Harris chairs the Steering Committee. Organizers anticipate that the Fair will become an annual event on the school calendar in all regions of the province.

Since planning time and resources are limited, and this is our first involvement with the program, the Steering Committee has concluded that this year's Fair will be a pilot project for schools in the Avalon region. The Committee members hope that the pilot will form the basis of a sound model for future Heritage Fairs, either regionally or provincially. At the same time, if your school is outside the Avalon region, you will have an exciting opportunity to participate in a very dynamic way through the Electronic Fair component of the Heritage Fair. You can communicate with your fellow teachers and students across Canada, and exchange ideas about our diverse heritage and culture through the Electronic Fair. Details will be arriving very soon at your school.

The primary focus of the Heritage Fair is to encourage students in Grades four to nine to use a variety of



formats to tell stories and share information about Canadian heroes and events, and to provide a venue for students to present their projects to the community at large.

STUDENT DISPLAYS

Students may prepare projects, either as individuals or in groups, in either one or a combination of the following formats:

- three-dimensional
- creative writing and performance
- audiovisual arts

WORKSHOPS

There will be opportunities for students attending the Fair to participate in hands-on workshops and field trips which explore and celebrate facets of Canadian history and our cultural heritage.

COMMUNITY DISPLAYS

Community groups and businesses will be invited to set up displays and provide resources to teachers and students.

ELECTRONIC FAIR

Schools will be able to communicate electronically with other groups across Canada, and exchange ideas about our diverse heritage and culture before the Fair in St. John's. Fairs taking place in different cities across the country will also be linked electronically on the same day to allow participants to communicate with each other and to interact with the Heritage Post Interactive, an electronic multimedia magazine on the Internet.

An information kit will be sent to your school shortly. In the meantime, for further information, contact Don Beaubier or Cle Newhook at the Heritage Fair Office: (709) 579-0310.

Ω

Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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COOPERATION



The COOPERATION Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the needs of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community and enterprise education, as well as provide programming for high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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GOVERNMENT OF
NEWFOUNDLAND
AND LABRADOR

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Fostering a Cooperative Spirit

The editorial that appeared in the first issue of *Prospects* ended with the sentence, "We believe that our human resource is by far our most valuable and holds the greatest potential." The experience that has been afforded our province by the Canada/Newfoundland COOPERATION Agreement on Human Resource Development justifies that statement and verifies the outstanding potential that is in our province.

In the four years and twelve issues of the journal since our debut, we have chronicled for you some of the most significant changes that have been occurring in our education system in quite some time. It has been a dynamic four years. By the end of the 1996/97 fiscal year the Canada/Newfoundland COOPERATION Agreement management committee had approved a total expenditure of \$34,367,618 on 598 projects. Many of these projects placed new technology into our schools, college and university. Other projects fostered professional growth initiatives, funded innovative curriculum development, and encouraged achievement in science, technology, mathematics and communications skills.

The program has been very successful at meeting the goals of placing new technology into our schools, college and university, and building the skills of our students and teachers. But the process relied on some very old technology: our ability to work

together toward a common goal. A major reason why the impact of the Agreement has been so significant is the partnerships that have been built along the way. The significance of these partnerships is demonstrated in many ways. The most visible is the financial expenditure. The total value of the 598 projects, once partner contributions are included, is over \$90 million. More importantly, however, there is a renewed sense of cooperation in our province. Educators, business people and other members of the community are working together to improve our schools and offer our children a better chance at economic success in the future.

Positive changes are already starting to occur. Newfoundland and Labrador students are performing better in the Canadian Test of Basic Skills and in international tests of skills in mathematics and science. The high school graduation rate in the province rose by 13 percent in the past six years and participation rates at the post secondary level are improving.

In this issue of *Prospects* we will explore the influence the Agreement has had on education and the economy. Educators from the university, college and the Avalon West District of the K to 12 system have offered articles concerning the impact of the Agreement on their sector of the education system. In an interview with Paul Mills, vice-president of the Atlantic Canada Opportunities

Agency for Newfoundland and Labrador, we discussed the impact the Agreement will have on the economic future of the province. We also spoke with Jack Botsford, past president of the Newfoundland and Labrador Alliance of Technical Industries (currently president and CEO of Operation ONLINE) about the impact of the Agreement on the growing information technology sector.

Much of this Agreement has been about changing attitudes: attitudes we held about ourselves and perceptions others held about our province. When people around the world look at our province today they see something very different from what they saw six years ago. Today they will find the only province in Canada that has every school in its jurisdiction connected to the Internet. They will find STEM~Net, one of the most comprehensive and inclusive educators' networks in the world. They will find research initiatives in new media learning, distance delivery of educational services, and curriculum and program development. They will find partnerships between business and educational institutions that promote the sharing of resources and cooperative study programs for students at all levels of the education system. They will find a province dedicated to building excellence in people.

Trudi Johnson
Albert Johnson
(editors)

The COOPERATION Agreement on Human Resource Development: Did it Work?

An interview with Paul Mills

"Today, a country's economy succeeds or fails on the strength of its people and their skills. In Canada, we have been experiencing an 'innovation gap' that needs to be addressed. Human resource development is the single most important thing we should focus on in Canada as a whole and in Atlantic Canada specifically."

Paul Mills - September 8, 1997

Even before the Agreement was signed in January 1993, Paul Mills was actively participating in its planning. At that time Mills was the Director General - Program Development and Delivery with the Atlantic Canada Opportunities Agency (ACOA). He also took on the responsibility of federal co-chair of the management committee that would govern the Agreement for the next five years. The Agreement is currently in the final year of operation. No new projects will be funded during this period, and the secretariat is administering the remaining projects and assessing their work. Mills has changed jobs since the Agreement began and is now the vice-president of ACOA for Newfoundland and Labrador. In a recent interview we asked him to reflect on the Agreement and what it

has meant to the province.

When asked to describe the role the program has played in the province's future economic growth, Mills explained that the Agreement has been ground-breaking and unique in the Canadian context in that it has brought together the federal and provincial governments in the area of human resource development. "The trend globally is to establish a real linkage between education and economic development," he said. "Today, a country's economy succeeds or fails on the strength of its people and their skills. In Canada, we have been experiencing an 'innovation gap' that needs to be addressed. Human resource development is the single most important thing we should focus on in Canada as a whole and in Atlantic Canada specifically."

"In terms of the actual

Agreement, the challenge is to demonstrate impacts. With the Agreement on Human Resource Development, we may have to wait several years to realize the impact of some of the projects. In the meantime, we will have to determine how to measure the impact. Hopefully, someone or some group will find a way of determining how to measure the impact of agreements such as this one and carry it out.

"We have gotten extremely good value for our money with this investment. The key concept was to use pilot projects as catalysts for further work and projects. In effect, we were underwriting the risks. We figure out what works and hopefully, find a means of continuing the project. Effects in the post secondary education sector have been readily apparent. For example, one project brought

together Memorial University and the business sector to design and implement an Applied Science and Engineering degree program. The result is students graduating from this new program with skills that the business community has been looking for."

One purpose of the Agreement was to support student achievement in science, technology and mathematics with the hope that these initiatives would help the information technology sector of the province's economy. Mills believes that the Agreement has accomplished what it has set out to do in this area. "If we look at what has happened elsewhere in this area," says Mills, "we can be assured of the potential Newfoundland and Labrador has for attracting business dealing with information technology."

"The infrastructure is already in place. Now we need to focus on content. We need to develop products to serve our own needs as well as build on our export potential. I think one unrealized potential is the exportability of our distance education capability. We have low cost technologies that have proven themselves over the Newfoundland and Labrador geographical size, variety of technology platforms and skill sets. What we have done here and can do should be relevant to developing countries. We need to be more aggressive in marketing what we have because it is saleable internationally."

A major focus of the Agreement has been to facilitate the development of partnerships between government, business and the community to foster projects in education. Mills believes this aspect of the Agreement has been critically important and has been one of the program's most significant successes. "Numerous school-industry partnerships have emerged. Instead of being isolated, schools are

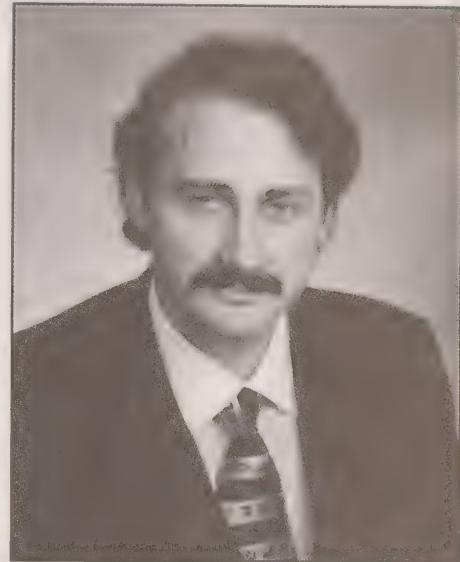
becoming a vital part of the community and local businesses and community groups have been going into the school to find a specific role there," says Mills.

"I feel that we need to work more closely on the linkage between the school system and community economic development process. Schools need to be part of economic plans in their communities. Students need to know what is happening economically in their community and in the rest of the province. We also need to promote greater linkage between labour and education."

"This Agreement had very ambitious goals. While some of the benefits are immediate, others more long-term, I think we have helped to raise the level of initiative and creativity within the school system. Certainly the level of awareness and participation among the various stakeholders has been extremely high. We reached the people we wanted to reach. Furthermore, the quality and creativity of projects were impressive. The projects represent a broad spectrum of ideas in all areas of education, K - 12 and post secondary. I have been impressed with their diversity and originality."

With the help of the Agreement, great strides have been made in the areas of technology education and technology integration. As the Agreement comes to an end, many educators are concerned about maintaining the lead that has been built. We asked Mills about programs that are available or may become available to support projects similar to those funded by the Agreement.

"There are programs to be availed of and they (educators) will need to work harder and dig deeper to accomplish what they want. Most importantly, they will need to utilize partnership concepts. For example, schools will have to work with zonal



Paul Mills, Vice - President of ACOA for Newfoundland and Labrador

boards and the private sector. There are efforts in many areas, such as the distance education initiatives through the Economic Renewal Agreement. The money may be more difficult to access than it has been through the Canada/Newfoundland COOPERATION Agreement on Human Resource Development but now they have the advantage of experience in how to access programs and build partnerships to support new projects and keep successful pilot projects alive." Ω

The Impact of the COOPERATION Agreement on Human Resource Development on the Public College System



by
Dr. Ron Sparkes

The Canada/Newfoundland COOPERATION Agreement on Human Resource Development (HRD Agreement) espoused the core intention of building excellence in people. Quite naturally, the regional colleges, now consolidated as the College of the North Atlantic, became a major vehicle for achieving this thrust. Building a stronger economic base and improving the competitiveness of the Newfoundland and Labrador economy through human resource development, the major purpose of the Agreement, was after all the raison d'être for government's establishment

of the public college system. An overlay of the intent and purpose of the Agreement with the mandate and work of the public college was a rather natural and highly efficient means of addressing the challenging needs of the times while utilizing public resources in an efficient and responsible manner.

The HRD Agreement served as a catalyst for improving and enhancing partnerships between the College and industry, the College and other agencies and the College and the community at large. Specifically, the HRD Agreement supported the College in the: (a) development of innovative

programs and enhancement of existing programs, (b) acquisition and upgrading of resources and technology and (c) human resource development of College personnel.

PROGRAM DEVELOPMENT

The HRD Agreement enabled the College to develop and deliver innovative programs that respond to the emerging needs of industry and thus contribute to improving the competitiveness of the Newfoundland and Labrador economy. The following are some examples of programs that were developed or enhanced with assistance from the Agreement:

Multimedia Diploma Program

Funding was approved to conduct a study of the viability of delivering multimedia training. The study found that feasibility and marketability of institutional based training in multimedia development are clearly supported by the training and skills which are demanded by the rapidly growing popularity and utilization of multimedia technology. The Agreement also provided resources to introduce the program at two campuses in 1995, Bay St. George and Clarenville. The first students will graduate from the program in the spring of 1998.

Computer Support Technician Program

This two-year diploma program responds to the demand for trained professionals to work in the rapidly growing information technology sector. The curriculum provides students with the knowledge and skills to install, configure, manage, troubleshoot and repair computer hardware with a focus on Local Area Networks, and Wide Area Networks. The College has been delivering this program at the Corner Brook Campus since September 1996. The first students will graduate in the spring of 1998.

Environmental Health Technology Program

This two-year post-graduate program supports a growing industry with good employment opportunities. Graduates may find employment with municipal, provincial and national health agencies, industrial and occupational health and safety, environmental and pollution control agencies, as well as the fisheries and hospitality industries. There is considerable interest in the program which is scheduled to begin at the Prince Philip Drive Campus in St John's during the 1997/1998 academic year.

Engineering Technology Programs Accreditation

Support from the Agreement enabled the College to prepare its programs for national accreditation by the Canadian Technology Accreditation Board (CTAB). Industry accreditation acknowledges that programs: meet or exceed the Canadian National Standards for Applied Science and Engineering Technology; have acceptable classroom, library, and laboratory facilities and resources; are taught by faculty who have an acceptable combination of academic credentials and industry experience; and produce graduates who have the expected competencies of graduate technicians and technologists. To date, 19 of the College's Engineering Technology and Technician programs have received national accreditation.

Computer Literacy Program

The Carbonear Campus of the College designed and delivered Computer Literacy training for community participants from the town of Victoria. This was a cooperative effort among the Education and Training Committee of Victoria, the Avalon North Integrated School Board and the Carbonear Campus. A wide variety of people from the community, including business people, homemakers and displaced fishery workers, participated.

Small Business Home Study for Women

Entrepreneurial training was delivered to approximately 45 women in their own homes in rural communities in Newfoundland and Labrador through the use of online networking, group teleconferencing and home study. This innovative approach to training broke down barriers of mobility and restrictions associated with family and job responsibilities. The

main objective of the program, delivered by the Clarenville Campus of the College in partnership with the Women's Enterprise Bureau, was to give women in the province the opportunity to develop the knowledge and skills necessary for self-employment. A corporate donation by Compaq Canada of 30 laptop computers assisted the Women's Enterprise Bureau in providing computer access and ongoing business counselling and support. Many of the women enrolled in the program were already operating small businesses and many others went on to open their own businesses during and after the program.

ACQUISITION OF RESOURCES AND TECHNOLOGY

In addition to program development, the Agreement allowed the College to move toward the establishment of state-of-the-art training centres in strategic skill areas. Such centres provide industry, labour and educators with access to leading technology for the training of the existing workforce as well as the prospective workforce. Centres established by the College, with support from the Agreement, include:

Automation Training Centre

A wide variety of industries are taking advantage of the increased power and flexibility of automation technologies to improve quality and efficiency and to reduce operating and production costs. The continued introduction of new control and automation systems means there is an increased need for industrial assistance and upgrading of the workforce. The Automation Training Centre at the Corner Brook Campus has been successful in serving the training needs of industries such as Kruger Pulp and Paper and Newfoundland Power, providing access to state-of-

the-art equipment for students, providing professional development opportunities for faculty and providing technology transfer to the community.

Manufacturing Centre

The Manufacturing Technology Training Centre, located at the Prince Philip Drive Campus of the College in St. John's, is positioned to offer assistance to the manufacturing sector of the province by providing the resources and training to meet the needs of local manufacturers. In addition, the Centre supports a three-year diploma program in Manufacturing Engineering Technology to provide training in the specification, implementation, operation, maintenance and supervision of manufacturing systems and personnel. This program has been accredited by the Canadian Technology Accreditation Board.

PROFESSIONAL DEVELOPMENT

Continuous learning is generally recognized as necessary for all workplaces and colleges are no exception. If our goal is for students to be lifelong learners, then instructors and the College as a whole must lead by example. If colleges are to provide relevant training to graduates and customized training for industry to compete in the economic market, faculty must possess the requisite knowledge and skills. The Agreement made a significant contribution to human resource development in the College. Some examples of initiatives supported are:

Professional Development Planning Program

An Individualized Professional Development Planning Program (IPDPP) gave College personnel the opportunity to develop a personalized and individualized model of assessing and planning their professional devel-

opment using distance learning technologies. Faculty and other personnel across the College system participated in the project which was initiated by the former Cabot College.

Civil Applications Training

This project provided training and inservice for approximately 20 instructors from the Engineering Technology faculty in the area of civil application software.

Geomatics Training

Training and inservice were provided for approximately 20 Engineering Technology instructors in the area of Geographic Information Systems (GIS). GIS is a computer based system that can process any type of information which is geographically referenced and is used increasingly by industry.

Prior Learning Assessment Training

This project provided for province-wide orientation of College Personnel to the process of prior learning assessment (PLA). PLA involves the assessment and appropriate recognition of an individual's prior knowledge and skill development acquired from work or life experiences, or other educational institutions. PLA provides several benefits including: more efficient use of resources, increased accessibility and bias-free judgement of non-formal learning. A prior learning assessment process will be fully implemented in the College during the 1997/1998 academic year.

The twelve programs referenced in the areas of Program Development, Acquisition of Resources and Technology and Professional Development highlight the enabling effect of this initiative in the interest of the mutual constituency of the College and the Agreement partners.

The enthusiastic and energetic response of Faculty and other College personnel resulted in the development of 45 programs that were supported by the Agreement and delivered through the College campuses resulting in a human resource investment of over \$3 million during the life of the Agreement. These programs stand as sustainable investments in the human resource development of Canada and Newfoundland and Labrador. Clearly, this was an Agreement born of understanding, insight and vision; an exemplary federal-provincial partnership that was planned, administered and implemented in the public interest. While the benefits of the Agreement will continue to flow well into the future as the essence of the programs continues, its absence leaves a considerable void. Here was an initiative that delivered resources for creative and results-oriented programs. This Agreement helped build a better tomorrow; however, this is a world where tomorrow quickly becomes yesterday. Canada, and Newfoundland and Labrador are now poised to move over the horizon of the once distant year 2000. We will do that and do it well because of our historical commitment to human resource development. The sustainability of this momentum and emerging advantage will depend in large part on the extent to which new human resource initiatives rise from the embers of Cooperation agreements of this nature. Ω

Dr. Ron Sparkes
President
College of the North Atlantic

The COOPERATION Agreement on Human Resource Development Boosts Memorial University's Research and Teaching Capability

by
Ivan V. Muzychka

"In the coming years, the information highway will transform Canadian society to the point where it becomes as unrecognizable to us as our society would be to the original settlers of Atlantic Canada. I want Canadians to welcome that transformation and benefit from it...Atlantic Canada has all the requirements to assume a leadership role in the knowledge-based economy."

Hon. John Manley,
Minister of Industry
November 1996

Economic factors and technological advances are changing the very fabric of today's society. Governments, educators and students all struggle to manage these changes. Many opportunities accompany profound change, but our ability -- as a province -- to capitalize on tomorrow's developments in education or business will depend heavily on how well we prepare today's students.

Over the years, Memorial University has prepared Newfoundlanders and Labradorians during times of change. The Canada/Newfoundland COOPERA-

TION Agreement on Human Resource Development (HRD Agreement) has enabled the university to continue in the role of preparing students for this new, technological world.

The benefits of the HRD Agreement will be felt in the province for a long time. The Agreement put some \$42 million dollars into various initiatives in Newfoundland and Labrador over the last four years. Memorial University -- the centre piece of higher learning and training in Newfoundland -- was one of the main beneficiaries of this Agreement. Over \$10 million made its way into university initiatives which came to life in an array of university departments. However, the real beneficiaries of these Memorial-based programs will ultimately be the coming generations of students.

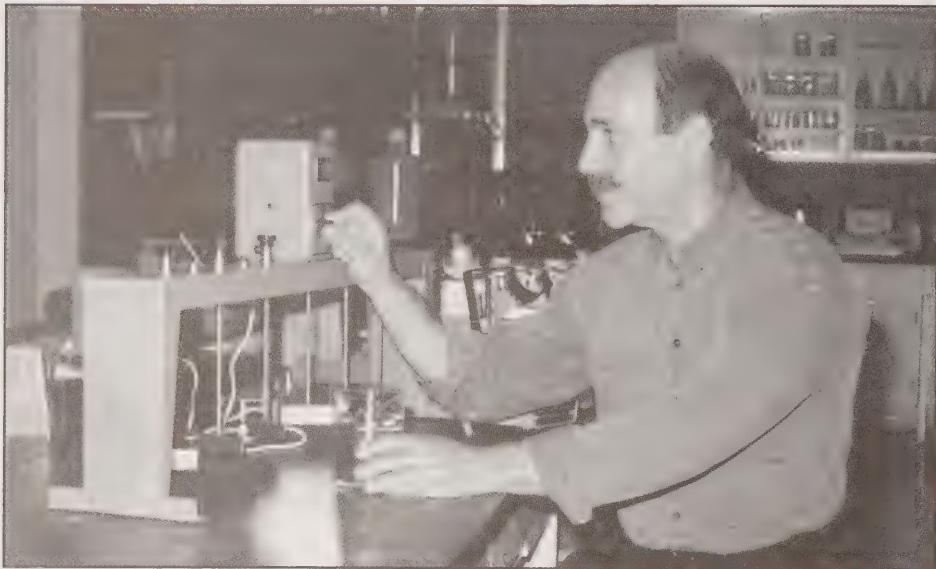
As Dr. Jaap Tuinman, Memorial's Vice-President (Academic) and Pro Vice-Chancellor, sums it up, "University budgets everywhere are under extreme pressure. Without the HRD Agreement a great many initiatives essential to the growth of the university would never have taken

place. The HRD Agreement quite correctly perceived the university as a key element in the development of Newfoundland's culture, social systems and economy."

The Agreement has funded new computer laboratories and has allowed faculties to create new graduate programs. Funding under this Agreement has also contributed to research initiatives aimed at learning more about such things as changing curricula and the effects of technology on learning. Finally, the university has been able to focus its expertise in specialized centres, developed to promote a provincial expertise in various strategic industries.

Taken together, these initiatives funded under this program have increased Memorial University's training and research capability. In many cases, the Memorial-based HRD Agreement initiatives will contribute to a corresponding increase in the economic opportunities available to all Newfoundlanders and Labradorians.

Agreement funding will also have a particular significance to rural parts of the province. "The infrastructure



Fred Curtis testing equipment in the new environmental laboratory

gained under this Agreement allows us to put in place courses which will especially benefit teachers and students in rural areas," said Dr. Terry Piper, Memorial's Dean of Education. "This funding will help redress the imbalance between rural and urban areas in terms of outcomes."

THE ROLE OF TECHNOLOGY

Technology is changing the world of teaching and learning. Several initiatives, primarily in the Faculty of Education, will examine how to best adapt the learning environment to the latest developments on the Internet, WWW, and the constantly evolving applications of the PC.

The Agreement has allowed the university to equip itself with new, fully computerized classrooms in the Faculty of Education. Funding from the Agreement has also helped the university renovate its physics laboratories. The new labs will help students learn concepts and file lab reports using computer technology. These new teaching and learning environments will allow for a whole new range of learning situations.

A NEW WORLD OF BUSINESS

A more competitive and global

business world has meant that new markets must be sought. In some cases whole new industries are emerging. New sectors, such as environmental industries, are lucrative and are there to be tapped by an international labour market. This market will likely include Newfoundland and Labrador companies and personnel. However, our competitive edge will depend on the level of expertise in these new areas.

With partial funding from the HRD Agreement, Memorial's Faculty of Engineering and Applied Science began offering an innovative graduate program which leads to a master's of applied science in environmental engineering and applied science. The one-year program is open to an array of students, not just engineering grads, and more than 25 students enrolled last fall. The program is part of an initiative in conjunction with other environmental programs offered under the Faculty of Science: the master of science in environmental science, and the master of environmental science, both of which are research-oriented degrees.

Unlike many sectors of the economy, the environmental sector is enjoying tremendous growth.

According to a study conducted by Employment and Immigration Canada, the environmental industry is worth \$8 billion, and employs between 60,000 and 70,000 people. It is currently a growth industry with a demand for skilled personnel. Canadians trained in this program also will be able to tap the estimated \$120 billion U.S. market.

HELPING LOCAL INGENUITY

To assist Newfoundland and Labrador-based companies thrive in this new business world, the university now offers local industry a Manufacturing Technology Centre (MTC). The centre will serve as a community resource for the education and training of engineers to support a growing Newfoundland and Labrador manufacturing industry. Included will be demonstration technology in three core areas: Computer Integrated Manufacturing (CIM); Product Development Technology; and Advanced Manufacturing/Robotics.

The HRD Agreement funding has also helped in the creation of a Biomedical Engineering Centre. The centre is a partnership between the Faculty of Medicine and the Faculty of Engineering at Memorial University. Through the acquisition of additional state-of-the-art equipment, this project is designed to expand the Medical Engineering Group (MEG) and Biomedical Engineering Centre (BEC). The BEC will specialize in medical technology, in particular, motion analysis and biomechanics. In addition to industrial benefits, this project will enhance the education and training of engineers and health care professionals.

INFORMATION TECHNOLOGY

For many years, Memorial University has been at the centre of information technology in Newfoundland and Labrador. Thanks

to the Agreement, the university is continuing to adapt teaching methods and the classroom environment to a new online world. A large number of projects funded by the Agreement are related to information technology.

A Chair in TeleLearning has been established in the Faculty of Education. Dr. Ken Stevens, the holder of the chair, will build upon the university's existing capabilities and activities in Telemedicine. The chair will also increase participation by the Faculty of Education in the preparation of teachers to use existing and emerging technologies. In particular, the chair will focus the Faculty's activities toward preservice education of teachers, support for teachers who are already teaching, heighten awareness and interest in science among the school children of the province, and foster foundational research.

A large portion of the HRD Agreement funding was directed to STEM~Net. STEM~Net, originally a Memorial-based initiative, continues to be the driving force behind the Internet in Newfoundland and Labrador schools. This initiative has benefited greatly through the Agreement's funding. (For more about STEM~Net see the article on page 14)

Globalization has heightened the importance of language. Funding from the HRD Agreement means there is now a different way to learn languages at the university. A new multimedia computer facility promises to make language labs come alive for students of both modern and classical languages. The new Multimedia Language Centre (MLC) is a cooperative effort by a number of academic departments in the Faculty of Arts: French and Spanish, German and Russian, Linguistics, and Classics. The centre also provides support for the English as a Second Language (ESL) program. It is the first system of



Karin Thomeier, Director of Language Laboratories (foreground) and Jennifer Bates, Programmer Consultant, MLC

its kind in Canada, making Memorial University a leader in the use of multimedia language instruction.

OTHER EDUCATION INITIATIVES

A Global Maritime Distress Safety System (GMDSS) Training Centre has been established at the Fisheries and Marine Institute. GMDSS is a research and rescue system, utilizing global satellite communications for which all existing and newly trained deck officers will require certification by 1999. This will be the first such training centre in North America and will attract widespread interest.

Funding under the Agreement has allowed for numerous research projects, especially in the Faculty of Education. Significantly, several research projects are exploring the curricula in multi-grade classrooms. Still other projects will study the effects of multi-grade and multimedia environments on students, parents and teachers.

Student bursaries were also funded in the Faculty of Education. This

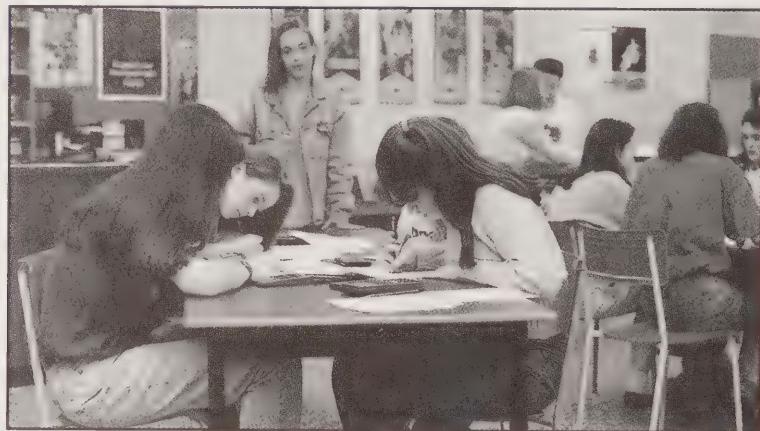
program was offered to students who specialized in science or mathematics while pursuing an Education degree, and to science and mathematics graduates who enrolled in an Education degree program.

This overview has highlighted some of the themes apparent in the HRD Agreement funding granted to the university. Many of the initiatives -- whether they be in information technology, or whether they are research studies in education -- will in most cases help students adapt to a rapidly changing world. Perhaps more importantly, however, is the fact that the initiatives funded through the university will lead to greater economic opportunities for the province. Ω

Ivan V. Muzychka
Manager, News Service
Division of University Relations
Memorial University of
Newfoundland

“I think I can, I think I can...We have to!”

by
Gordon F. Stone
and
Mary Tucker



“I think I can, I think I can!” is a phrase familiar to us all. It is a survival message that is engrained in every Newfoundland and Labradorian. John Cabot heard that call 500 years ago when he took the tiny “Matthew” across a massive ocean. Al Chislet and Chris Verbiski ignored all previous geologists who tested that red hill and for their persistence found the pot of gold. But hold on now! These people also had a little help along the way. Great achievements are never solo acts.

The educators in Avalon West School District have had tremendous success throughout the 1996 /97 school year. Hayward Blake, Ascension Collegiate, was voted outstanding administrator by the Canadian Federation of Principals. Dennis Galway, Amalgamated Academy, received the Prime Minister’s Award for excellence in

mathematics and science teaching. The Roy Hill Award for English Teaching Excellence was given to Jack Reid at St. George’s High School. Gordon Stone and Kimberley Walsh, Carbonear Integrated Collegiate, received the Conference Board of Canada’s Business and Education Partnership Award. Like all the achievers before them, they did not do it alone.

Ascension Collegiate, St. George’s High School, Carbonear Integrated Collegiate and Amalgamated Academy have all had a silent but powerful ally...the Canada/Newfoundland COOPERATION Agreement on Human Resource Development (HRDA). Because of the Secretariat’s support, it was possible to: provide advanced placement courses; provide information technology to interface intermediate science laboratories; teach com-

puter business accounting; publish creative writing and generally enrich the curriculum. Each of these schools has received HRDA grants and without doubt would not have achieved their level of technological advantage and professional development without the support of the Human Resources Development Agreement. We are very thankful for the boost our silent partner has given us. Here are just a few examples of HRDA-funded projects.

In recent years we have seen a rapid growth in the use of computer technology in our schools. A “Technology Inservice” project provided teachers in our district with inservicing in computer literacy and relevant software applications. The project was an enormous success. Also at the board office level, a “Job Shadowing” project promoted interest in teaching and educational adminis-

tration as a career choice.

A "Science Enhanced Strategies" project at St. Edward's Elementary School in Brigus gave the school an opportunity to increase science resources as well as enabled students to visit a number of sites to participate in hands-on activities to enhance their science knowledge and understanding. At Laval High School, the "Pathways to Computer Literacy" project provided computers, software and training in computer technology. Two schools in the district, St. Anne's Academy and Holy Rosary in Freshwater, established enrichment centres in classrooms through the "Challenging Resources" project. St. Anne's also began a community-based newspaper called "The New Foghorn". A Literacy Support Program at Holy Cross Elementary School helped to expand the computer technology program and inservice staff and students. Fatima Academy was able to upgrade the computer laboratory and bring in Internet resource information to their local area network.

A project entitled, "Bridging the Gap" at Ascension Collegiate led to the development of supplementary laboratory activities in the science curriculum. These activities were designed to enhance curriculum topics, utilize equipment specific to post secondary courses and offer instruction in standard laboratory techniques used at the post secondary level. Through another project entitled, "Creating New Limits", Ascension Collegiate developed a partnership approach with business and community groups to offer students educational opportunities. The project expanded the technological resource base at the school through the decentralization of the school's computer resources from a laboratory setting to the classroom. This approach has allowed for the integration of tech-

nology into the curriculum.

"Networking the Future" was an HRDA-funded project which enabled students of Amalgamated Academy to access the Internet as a resource and provided greater networking potential within the school whereby access could be gained from each classroom. Similarly, a "Technology Enhanced Curriculum" project at Carbonear

grouping students by age rather than by the conventional grade structure. A joint project between Perlwin Elementary School and the Public Library Board brought the school and community together. The Library was relocated into the community school with a modern technology component so that members of the community could access the library during school hours, evenings and weekends. In the area of career exploration, a project conducted at Persalvic/Jackson Walsh provided an avenue for students and parents to explore career opportunities through the use of technology applied at home and in the school.

The HRD Agreement has meant a great deal to the Avalon West School District. The Secretariat has enabled us to provide professional growth and technological enrichment to several of our schools. Many programs and services have become more dynamic for students and teachers because of the advantage afforded to us by the Agreement. Unfortunately, the loss of the program is going to mean that instead of supporting the basics and going competitively ahead, we will in many instances be limited to maintaining the basics. We can only hope that those responsible will become more like Cabot, Chislet and the Little Engine and instead of saying we can't, will say, "I think I can, I think I can...We have to!" Ω

*The HRD
Agreement has
meant a great deal
to the Avalon West
School District.
The Secretariat
has enabled us to
provide professional
growth and
technological
enrichment to
several of our
schools*

Integrated Collegiate expanded the possibility of using the Internet as an instructional tool in the grades seven to level III curriculum.

A pilot project in multi-age education was conducted at Coley's Point Primary School through funding provided by the Agreement. The project studied and assessed the benefits of

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The COOPERATION Agreement on Human Resource Development and Business: The Impact on the Information Technology Sector

an interview
with
Jack Botsford

The goals of the COOPERATION Agreement on Human Resource Development are to improve achievement and participation in science, technology and mathematics; to improve achievement in written and communication skills; to help educational and training institutions respond to the needs of small business; and to encourage a cooperative, working relationship between education, business and industry. The skills and attitudes that are being encouraged and developed by projects funded by the Agreement can be applied to many sectors in the business community. Information Technology (IT) is one of the fastest growing industries in this province and in the rest of the world, and many of the projects place emphasis on the skills required to succeed in this new business environment. Jack Botsford is the past president of the Newfoundland and Labrador Alliance of Technical Industries (NATI) and is

currently president and chief executive officer of Operation ONLINE (Opportunities for Newfoundland and Labrador in the New Economy). In an interview he offered his views on the role the Agreement has played in fostering growth in this sector of the economy.

Botsford is enthusiastic about the impact the Agreement is having on the IT sector. He feels that the program is encouraging skills and attitudes that are essential to the business community. "A key element of economic success is human resources," he says. "Anyone who is aware of workplace demands knows that business is looking for people who are flexible and innovative in their thinking. These are skills which are not necessarily taught in a conventional manner. We need people who, besides having a basic technical background, are willing and capable of learning new things, who have an attitude of curiosity and pride. The HRD

Agreement has focused on promoting that kind of growth in young people. That is certainly the single largest and most significant economic output of the Agreement. Another major achievement has been to develop and fund the presence of information technology in the schools."

Botsford cited examples where students had demonstrated remarkable levels of technical and artistic achievement in the creation of products for the IT sector. A recent project of NATI was a contest for web site design called "The Night of the Living Web." The contest was hosted by Cable Atlantic. There were 25 entries and prizes for the participants included Operation ONLINE'S donation of a trip to a multimedia conference in New Brunswick. Entries were divided into two categories: corporate and educational/private individuals and the entries were judged in three areas: technical achievement, aesthetics, and effectiveness. The judging

was done remotely by IT and design professionals in Scotland, Ireland, England, and Ontario. "The level of skill demonstrated by young people (high school students) was very impressive," says Botsford. "Many of them developed these skills through projects sponsored by the COOPERATION Agreement on Human Resource Development."

Building a cooperative spirit between educational institutions and business is an important goal of the Agreement. When asked about the business/education climate and the nature of partnerships that have been developed, Botsford feels that a great deal of progress has been made. "The Agreement has definitely brought individuals and groups together," he says. "As an example, school science clubs have partnered with the Institute of Marine Dynamics and the Department of Mines and Energy. The Newfoundland Science Centre has progressed from the earlier days of travelling exhibits to its current location in the Murray Premises in St. John's. The HRD Agreement has been pivotal in its progress. Star Lab is another project sponsored by the Agreement." Botsford sees these types of projects as nurturing curiosity which can be a powerful economic force in any community. He believes that these and other initiatives could not have taken place without the formation of strong partnerships.

Botsford feels that businesses receive far more than public relations value when they partner and invest in initiatives in education. Projects like Shad Valley and internship programs are important learning experiences for young people. "In the long term," says Botsford, "businesses that are engaging in activities like these are doing human resource development. Businesses receive two things: they get to interact with innovative and energetic young minds and they help



Jack Botsford, President and CEO of Operation ONLINE

to develop a pool of talent which, as employers, they will eventually be drawing from. Many companies are thinking this way and are developing ways to bring young people into the workplace. Generally, the comments of employers who participate in these programs are very positive. People who have not had much previous involvement in education are energized by the experience. A good example is the Innovators program conducted by the Engineers' Association. These partnerships will have done a great service if they successfully break down the adversarial attitude that tends to blame education for problems in business and the economy.

"Information Technology is going to be an important part of the Newfoundland and Labrador Economy," explains Botsford. "The challenge is to develop more awareness of employer needs and career opportunities in this sector. There are an estimated 20,000 - 30,000 jobs vacant in Canada right now in this area. We still have a long way to go

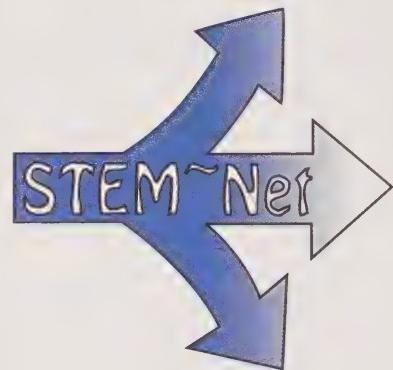
to make people in the K-12 system aware of opportunities and the general direction of the economy and how quickly it's changing. Employers in the IT community constantly need to make students aware of the skills they will be seeking. The whole nature of work is changing. More and more jobs are contractual which means young people will have to keep up their skills base. One mandate of Operation ONLINE will be to focus on distance learning; production of content materials and delivery of learner-centred content; effective learning and give learners an opportunity to develop exportable skills. In this way, Operation ONLINE will be building on the skills and attitudes fostered by the HRD Agreement." Ω

STEM~Net: Building a Foundation for the 21st Century

by

Harvey Weir

in consultation with the STEM~Net staff



STEM~Net has helped Newfoundland and Labrador move to the forefront of educational networking worldwide. The Canada/Newfoundland COOPERATION Agreement on Human Resource Development (HRDA) funded the start-up and implementation of STEM~Net over a four-year period, and this was supplemented and has been continued by the Department of Education. In addition, significant contributions were made by a number of STEM~Net's public and private partners. These components were brought together by the small, but dedicated, STEM~Net staff, with feedback and input from users and with guidance by volunteer advisory boards, councils and committees. The extensive involvement of the province's professional K-12 and public college educators, especially classroom teachers and instructors, translated this support into online activity and success.

GETTING STARTED

The STEM~Net story goes back about six years to early 1991 when

Don Hogan of ACOA went looking for partners to build a computer network for science teachers in the province. A feasibility study, commissioned by Hogan, concluded that a science teachers' network was needed and recommended that Memorial University be asked to design and implement this network. The concept was presented at a special conference in Clarenville in March 1992 and was endorsed at the annual general meeting of the NLTA Science Council in April of that year.

Dr. Jaap Tuinman, Vice-President (Academic) of Memorial University, accepted Mr. Hogan's challenge and invited Harvey Weir of Memorial's Science Faculty to work with him on the project. Tuinman and Weir decided that such a network should be based on a thorough assessment of the needs and views of educators and technology leaders in the province.

Following the Clarenville conference, Wilf Bussey, Director of Computing and Communications at Memorial, initiated a small Internet "pilot," which, by the fall of 1992, involved more than 20 teachers in

five regions of the province. This pilot group, along with Mr. Bussey and his staff, played a prominent role in the design, development and implementation of STEM~Net.

BUILDING SUPPORT

Although Tuinman's leadership and Weir's organizational efforts were important, they both knew that for STEM~Net to be successful it had to be built by the community of users, primarily teachers, and supported by public and private partners. The initial STEM~Net funding proposal was based on the input of more than 300 people from more than 70 organizations. The ten-person STEM~Net Proposal Advisory Committee helped summarize this input and create a development plan. The initial STEM~Net online program was based on input from nearly 80 people, more than 70% of whom were classroom teachers, at a two-day planning conference in Gander in May 1993. The process was repeated two years later, again in Gander, with a special conference on the future of STEM~Net. During the past four years, more than

600 teacher volunteers have given generously of their time, energies and expertise, serving as lead teachers in every school in the province. Many more from the private and public sectors have served on various STEM~Net boards, councils, committees and working groups. The STEM~Net Board of Directors, representing major stakeholders and chaired by Dr. Tuinman, has played a key advisory role in STEM~Net's development.

STEM~Net has developed key partnerships which have contributed to its success. For example, Memorial University covered most of the initial planning costs. School districts made STEM~Net implementation a priority, co-hosting training workshops, assigning substitute teacher days, providing facilities and cost-sharing staffroom computers. Several NLTA special interest councils organized STEM~Net presentations and workshops, covering planning and participants' costs. NewTel Communications contributed advice to the planning process and provided initial connectivity at rates below market levels. Digital Equipment of Canada supplied the "calvin" server system at close to cost and donated the "susie" server outright. Cable Atlantic initiated the STELLAR Schools program, making connectivity available to schools in its Internet service regions for a four-year period without monthly backbone service charges. Keyin Technical College placed work-term students with STEM~Net at no charge for several terms during the past three years. AT&T Canada (Newfoundland) tendered long-distance rates significantly below regulated levels and then provided an additional generous rebate for this year. In return, STEM~Net has provided extensive public recognition for these and many other partners, has helped develop the computer and communications marketplace

across the province, and is contributing to improvements in the education system, thus helping to ensure the future prosperity of these partners.

IMPROVED COMMUNICATIONS

STEM~Net's first stated goal was the improvement of communications. Before STEM~Net went online, less than one percent of teachers had Internet access, and most telephone and fax communications among teachers were severely limited by expensive long-distance rates. Today, nearly 90% of teachers have Internet accounts and more than 40% of them are very active users. To facilitate usage, a computer with a modem was placed in the staffrooms of each school in the province, cost-shared between STEM~Net and the school boards. Electronic mail and the world-wide-web have become major tools in distributing information to educators by the Department of Education, school boards, the NLTA and Memorial University.

STEM~Net has worked closely with Cable Atlantic and the school districts to develop the STELLAR Schools program. By early 1998, it is projected that more than 150 schools, representing nearly 70% of the students in the province, will have their local area networks transformed into Intranets and linked to the Internet.

As part of that program, schools in the northeast Avalon region are receiving high-speed connections to the Internet, thus permitting multimedia communications, and introducing teachers and students to the information superhighway of the future. With funding from the HRDA, STEM~Net has also tried to promote the Stentor-SchoolNet DirectPC satellite initiative to bring improved connectivity to rural and remote schools.

It was felt that a friendly user

interface was important to easy usage and improved communications.

STEM~Net began in 1993 with a simple, but effective, menu system accompanied by the list-based gopher information system. By 1995, a graphical interface had been added for Windows users, accompanied by the world-wide-web information system. STEM~Net's award-winning home page has organized and simplified web access for educational users in this province, and is visited every day by many people around the world.

STEM~Net was also funded to help rural public colleges link to NLnet and the Internet. STEM~Net cost-shared staffroom computers and covered most rural access costs from October 1993 to April 1996.

STEM~Net also issued dial-up accounts to more than 200 rural college faculty and staff, and provided training for lead instructors. With the consolidation of separate colleges into the College of the North Atlantic, a new high-speed network is being deployed, and this new College will be assuming all responsibilities for its own access and accounts.

THE INFORMATION HIGHWAY

When STEM~Net went online in September 1993, only St. John's and Clarenville had local Internet nodes. In partnership with the Newfoundland and Labrador Network (NLnet) of Memorial University, and with support from the HRDA, STEM~Net helped bring local Internet access to an additional 18 regions of the province, thus increasing local access from 25% to more than 67% of the province. With strong encouragement from STEM~Net, the private sector has now increased local Internet access to more than 75% of the province. STEM~Net has also worked closely with the Provincial Public Libraries' Board to promote and support the



STEM~Net Staff: (left to right) Back Row: Harvey Weir, Leo Harlick, Dale Fraser, Ken Penney, Nancy Parsons Heath, Front Row: Deanna Janes, Joan Genge, Vicki Hoven and Beth Power (Missing from photo: Frank Shapleigh)

Community Access Program (CAP) of Industry Canada, and thus make the Internet available at public locations, such as libraries, to many people who do not have computers and modems at home. The STELLAR Schools program has given Cable Atlantic an additional test bed for intensive usage of high-speed connections, thus contributing to the development of the information superhighway in the province.

ECONOMIC BENEFITS

STEM~Net has brought both direct and indirect economic benefits. Direct benefits include a large infusion of public monies into telecommunications, to the extent of nearly one million dollars a year, with NewTel Communications being the primary recipient. This may have encouraged Newtel to implement new telecommunications infrastructure and may have reduced some of the pressure on rising local phone rates.

A second direct benefit has been

employment. STEM~Net has a total of ten full-time and part-time staff. STEM~Net has worked in partnership with the Public Libraries' Board to create summer employment opportunities for university and high school students, with nearly 40 being employed in 1996 and more than 50 in 1997. Although about half of the STEM~Net positions involve short-term contracts, they do provide an opportunity for young graduates to obtain workplace experience that will help them obtain more permanent opportunities. STEM~Net workterm placements by Keyin Technical College and other technical institutions serve the same purpose.

A third direct benefit is the promotion of Newfoundland and Labrador, with potential advantages to tourism. The attractive STEM~Net home page attracts visitors interested in education and provides them with links to other provincial web sites with provincial and tourist information. STEM~Net's

acclaimed leadership in educational networking world-wide has drawn attention to the province as a significant player in information and communications technologies.

The expansion of the Internet into the province, aided by STEM~Net, has created additional employment opportunities, in both the network and the content areas. Companies such as Cable Atlantic, NewTel, CanCom and Compusult provide Internet access in different regions of the province. Many other companies are involved in web page development and promotion, some of whom obtained their initial experience as STEM~Net users.

The primary indirect economic benefit comes from education and the improvements that STEM~Net has supported. While it may take many years to see a direct benefit here, nevertheless, it is of considerable importance.

IMPROVED TEACHING

STEM~Net was also created to help teachers and other educators improve teaching and learning. Teachers have used STEM~Net extensively to improve their qualifications and preparation, in both credit and non-credit settings. In the formal or credit environments, teachers have used STEM~Net to take courses online, in a range of subject areas from several universities including Memorial.

In the non-credit setting, STEM~Net's network training workshops and familiarization sessions have been heavily attended by teachers and other educational leaders, as have other presentations and workshops organized by the Department of Education, school districts, the NLTA and Memorial University. STEM~Net training has included advanced workshops for lead teachers and coordinators, and web authoring for edu-

tional developers at all levels of the school system. STEM~Net had the good fortune to second Frank Shapleigh as its Senior Training Officer, who has run "hands-on" workshops throughout the province for the past four years. As a result, this province's computer studies, technology education and learning resources teachers are among the best qualified in Canada.

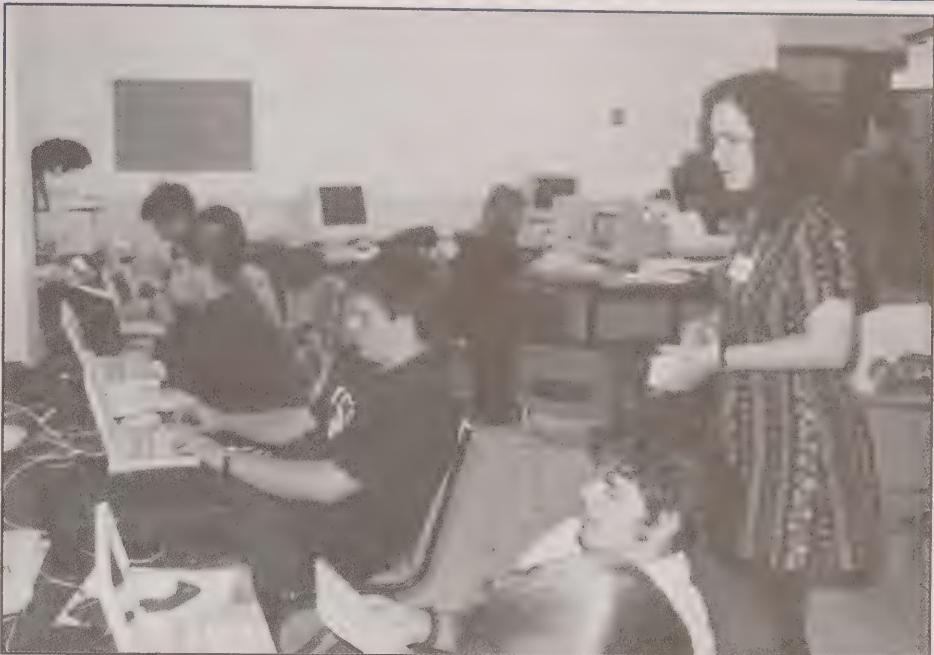
Teachers have also used STEM~Net extensively to access online resources to enhance their classroom teaching, drawing on the Internet as a vast online encyclopedia of knowledge and insight. However, usage has gone beyond simple information to include teaching and learning goals related to literacy, self-teaching, critical thinking, problem solving, writing, inventiveness, and creativity in a myriad of forms.

IMPROVED LEARNING ENVIRONMENT

As early as May 1993, teachers were calling for access by students for curriculum-related activities. STEM~Net responded by establishing the Class Project Network in the fall of 1994, providing class accounts for student access within curriculum projects led by teachers. This was extended nationally in 1995 with the creation of SchoolNet RINGS (Reports and Investigations by Networked Groups of Students), a project system that originated with educators in two rural school districts (Clarenville and Marystow).

SchoolNet then expanded the RINGS concept to create the "GrassRoots" project system. With guidance and support from STEM~Net, Newfoundland and Labrador has become the most active province, with nearly one-third of all national GrassRoots projects during the past two years.

The SchoolNet News Network



Beth Power works with students at the 1997 installment of Hook, Line and Net as they prepare the August issue of SchoolNet News.

(Rédaction de Rescol) is a national expository writing project for students, organized and managed by STEM~Net. This online monthly publication, with English and French language versions, contains articles on a wide range of topics, written by students across Canada. STEM~Net has also built a mentorship program to link students in selected schools to professional journalists and journalism students.

Students have also been actively involved in the development of their school's home pages on the web. Some students throughout the province are obtaining part-time and summer jobs in the private sector developing web pages and helping install Internet software and systems, drawing on their school-based experiences.

Perhaps STEM~Net's largest direct contribution to student access in an improved learning environment comes from its partnership with Cable Atlantic in the STELLAR Schools system, truly "Striving Towards Excellence in Learning by Linking

Activities and Resources".

IMPROVED CONTENT

STEM~Net has contributed to the development of quality curriculum-relevant content. A web-page development workshop was held in Gander in May 1995 and brought together more than 20 teachers and other educators to learn web authoring skills and to produce sets of curriculum relevant materials and links for several subject areas and grade levels.

STEM~Net is especially concerned with content for science, technology education and mathematics. For example, STEM~Net worked with the Department of Education and three other provinces, as part of the East-West consortium, to develop an introductory information technology course for the Internet. One of STEM~Net's contributions was a module on graphic design, prepared by Frank Shapleigh and Leon Cooper.

STEM~Net's interest in content goes well beyond science and technology. It has recently worked with

the Division of Student Support Services of the Department of Education to adapt the contents of the excellent document, "Programming for Individual Needs: Using Technology to Enhance Students' Differing Abilities", to the world wide web. This will be of considerable interest to both teachers and parents of students with special needs.

Schools and students are also involved in content development for the Internet. STEM~Net has been actively supporting SchoolNet digitization activities such as the Books of Remembrance project and the Monuments project, both involving students in this province. This past year, STEM~Net initiated the online Heritage Web Fair, in partnership with the CRB Foundation, and with support from Cable Atlantic and Keltic ISG Technologies. This K-12 fair, which was run as an exhibition rather than a competition, saw entries and significant interest from all regions of the province. The STELLAR Schools program, with at least three major student projects per school, is expected to add significantly to the student-based content on the Internet. STEM~Net is encouraging the development of content by schools in long-distance areas and on slow phone lines, by providing extensive web space on one of its high-speed and large-capacity servers to be managed by, and identified with, each school.

EDUCATIONAL LEADERSHIP

Although STEM~Net views itself primarily as a service organization, providing Internet accounts and access to teachers in the province, its greatest contribution during the past four years may have been one of leadership. When STEM~Net was being planned the Internet was primarily an academic network linking universities, colleges and research organiza-

tions, and the world-wide-web was a primitive tool being used by international teams of physicists. Very few teachers, public libraries or homes had access to the Internet at that time and very few of them had heard of the web. With STEM~Net leadership, schools and teachers in this province were among the first in the world to be connected to the Internet and have access to the world-wide-web.

There has also been leadership in the area of Internet training and awareness. In addition to the extensive advanced training program for teachers and other educators, in 1996-97, STEM~Net organized a series of five round-tables related to the uses of the Internet and related technologies in education. In August 1995, STEM~Net organized, with the aid of a local committee in Corner Brook, a major conference and set of workshops for teachers, along with a "Net-Camp" for their children. In August 1997, STEM~Net organized, with the aid of a local committee in Gander, a similar conference and set of workshops for young people, with a "Net-Camp" for their parents and teachers. Many of the workshop sessions were led by these young people.

STEM~Net has also provided leadership on a national scale. The director of STEM~Net is the founding chair of the Canadian Educational Network Coalition. STEM~Net was a founding member of Canada's SchoolNet initiative, and Harvey Weir chaired its Connectivity and Technology Committee for three years. Although the battle to obtain significantly lower rates for long-distance access to STEM~Net and School Net is still being fought, the primary national leadership in this endeavor has come from STEM~Net. SchoolNet RINGS, the SchoolNet News Network and the GrassRoots Projects are three of the activities in

which STEM~Net has been a national leader.

However, STEM~Net's most important leadership contribution has been at the school level. STEM~Net has had a very positive effect on school-based use of computer and communications technologies, and has supported the outstanding contributions from the HRDA in this area. Although STEM~Net started as an educator's network, it has provided leadership in promoting teacher-supervised school access to the Internet, and the development of a web presence by each school in the province.

In summary, STEM~Net has helped schools and teachers obtain and effectively use many of the information and communications technology tools that they and their students will need for life-long learning. In this way it has supported the very progressive mandate of the COOPERATION Agreement on Human Resource Development. It has also supported the equally progressive agendas of the Department of Education, the school districts and the NLTA. A solid foundation is being built for the 21st century. Ω

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Project Profile

Strategic Directions in Education: Building a School District Plan

by
Harold Press



When 10 new school districts began operations in January 1997, one of the early challenges was to attempt to anticipate and prepare for the future needs of learners through the development of a long-term educational plan. However, with key developmental, resource and personnel issues confronting new districts as they started, none was in a position to begin the demanding process of developing and implementing a fully integrated planning process.

In January, Vista School District (formerly School District #8) and the Department of Education entered into a partnership to begin a strategic planning process for the new district. At the core of the agreement was the sharing of resources to begin a planning process, to develop a comprehensive planning model, to develop tools and instruments to facilitate the

process, and to make the model, instruments, and findings available for other districts that wish to follow. It is anticipated that the strategic plan, when finalized, will provide the blueprint for change and growth in the school district.

Strategic planning is a systematic cycle of events that helps an organization understand fundamental issues, define policy choices, and establish priorities for action. The purpose is to establish a general framework by which decisions are made about intended future outcomes (objectives), about how those outcomes will be accomplished, and about how success will be measured and evaluated. Once fully integrated, the plan will help clarify future direction, help focus organizational resources on the highest priorities, help resolve important issues, take advantage of opportunities and deal with challenges, and

help the entire organization move in the same direction.

THE MODEL

One of the first tasks was the development of a comprehensive planning model. While many models for strategic planning exist, all contain at least six basic elements: mission, needs assessment, strategic objectives, outcome measures, strategies, and implementation/feedback. The main components of Vista's model include: (1) pre-planning, which includes setting time frames, identifying stakeholders, and building structures, processes and supports; (2) development of mission and belief statements, which spell out what is important; (3) completion of a comprehensive organizational review, which assembles extensive information about the school district and identifies organizational patterns,

strengths and challenges, and external trends; (4) creation of a vision for the district; which includes goals and objectives, as well as measures that will demonstrate if and how the objectives have been achieved; (5) establishment of priorities and strategies, which spell out what is possible and achievable within the framework and resources of the district; (6) development of action plans, which include activities, structures, processes, resources, responsibilities, evaluation, communication, and time frames; and (7) implementation, monitoring, and evaluation.

To achieve all of the elements of the plan a number of structures were established. The primary guiding force for the process was a planning team. The primary function of the planning team was to oversee the planning process and to give direction and support to the process. An external consultation team, designed to give feedback to the process, was established at an early stage. Two internal working teams—a mission statement team and a district profile team—were central to the organizational review and visioning processes. In addition, a great deal of counsel, support and assistance was provided through the district Administrative Council.

Identifying the beliefs and formulating the mission are activities that require early attention in the planning process. Beliefs are those statements that all trustees and employees of the school organization truly believe in and are prepared to defend and promote. They are the values that establish the moral and ethical priorities which serve to guide all the organization's activities. The mission statement describes the organization's purposes or the changes in the world that the organization intends to effect. It is a clear and concise statement that reflects the organization's beliefs. Several means were used by

the mission statement team to collect opinions about the district's purpose, its core values, its distinctiveness, and what its responses should be to its key stakeholders.

Referred to by different names, such as needs assessment, environmental scan, SWOT analysis, and performance audit, the organizational review is a comprehensive assessment of the forces and conditions that influence the success of an organization in achieving its mission. Those forces may be external—opportunities or threats to the organization, such as

Ten new surveys were designed for the review process. Once completed, the profile team developed an extensive background document about the district that was used to guide subsequent phases of the planning process. The backgrounder included information about the region, the district, the schools, student achievement, and key strengths, challenges and trends.

Perhaps the most critical stage in the planning process is the formulation of a vision of the future for the district. It is at this stage where the input of all stakeholder groups—both from within the district and from elsewhere in the province—are required to help build a framework of "what is possible" and "how it can be achieved." This is the stage where the vision of what is possible, of what needs to be done, and of how it is going to be measured and evaluated, is hammered out. The construction of creative, practical and effective goals, objectives and strategies required a comprehensive visioning process.

Perhaps the most critical stage in the planning process is the formulation of a vision of the future for the district.

changes in economic conditions, population, technology, environment, or legislation—to the organization, or internal—strengths and hindrances that bear on the organization's ability to achieve a desired future. They are those events, activities, processes, strategies, policies and leadership qualities that contribute either in a positive or negative way to the overall organizational experience.

To complete the organizational review, the district profile team consulted with other agencies; compiled a summary of district programs and services; analyzed trends and developed projections; analyzed existing anecdotal, testing and survey data; collected and analyzed new evidence; identified strengths; and assessed challenges.

THE ROUNDTABLES

The visioning process required two key steps. The first of these involved the identification of critical issues. Using focus groups, 46 issues were identified and then reduced to six provisional strategic directions (goals) for the district. The second step was to organize a comprehensive visioning process in which objectives and strategies were identified for each of these goals. To achieve this end, a series of roundtables on these provisional goals for the district was organized and held during the last three weeks of May, 1997.

Sponsored in part by the Canada/Newfoundland COOPERATION Agreement on Human Resource Development, the roundtables brought together key individuals from all parts of the district and from across the province. Invited partici-

pants included parents, students, teachers, non-teaching staff, administrators, district staff, local community, church, business and government leaders, university faculty,

Department of Education personnel, school council representatives, school board trustees, and educators from other school districts and schools. In addition, through the local media, other interested individuals were invited to participate in the process. Over 150 people participated in the roundtable sessions.

The purpose of the roundtables was to develop clear and precise objectives and strategies for the future. The objectives (strategic directions) are at the heart of the strategic thinking of an organization. They reflect the position of the organization at some future date. Objectives represent commitments to significant results and should present reasonable targets to be achieved. A critical question asked is: "Is this what we want the future to look like in five years?" The strategies tell how the organization will accomplish the objectives and realize its mission. They set the framework for the actions that will follow.

Each roundtable was organized and facilitated by a three-person planning team made up of members of the district's administrative council. Each planning team developed its own structures, speaker and participant list, information package, and schedules. The information package included information about the planning process and the district backgrounder (both common to all roundtables), and an issue backgrounder (unique to each roundtable). In addition, post-planning sessions were held. All roundtables were one day in length and were held at St. Jude Hotel, Clarenville.

The first of the roundtables, "Building Learning Organizations",

was held on May 13. The purpose of this session was, among other things, to understand how we can build inspiring and motivating learning organizations for students, how we can ensure continuous growth and improvement of schools, and how we can provide meaningful growth opportunities for all staff and volunteers. Dr. Bruce Sheppard, from Memorial University's Faculty of Education, opened the morning session by addressing two key questions: "What is a learning organization?" and "Where are we as learning organizations?"

The second roundtable, "Building Partnerships for Learning", was held on May 15. The purpose of this session was to understand such things as: how do we formulate successful relationships that have mutual benefit to all partners, how do we identify and facilitate meaningful roles for parents, and what is the role of partnership education and community education? Steve Brooks, principal of Bishop White All Grade in Port Rexton, began the morning session by defining, describing, and giving examples of learning partnerships. Rod Regier of the provincial Department of Development and Rural Renewal, provided numerous examples of working partnerships in the region and presented a vision of what is possible for the future.

The third of the roundtables, "Improving Student Achievement", was held on May 21. The focus of this roundtable was, among other things, how to define reasonable, demanding and attainable levels of student achievement, what is the role of standardized tests, how do we ensure a close match between instructional objectives and what is taught, and how do we link results and actions? Dr. Lenora Perry Fagan of the Division of Evaluation, Research and Planning, opened the morning session

by speaking about how student performance is monitored at the Department. Patricia Maxwell of the Division of Program Development, spoke about how the essential graduation learnings can be linked with everyday practice. Finally, Peter Gamwell, principal of Bayview Heights Academy in Gambo, provided stimulating examples of how schools can move towards the achievement of excellence.

The fourth of the roundtables, "Using Technology Equitably and Effectively", was held on May 23. The purpose of this session was to understand such things as: how do we keep up with technology, how do we ensure that all students have opportunities to learn with and about technology, what is a core technology standard for all schools, what are the implications for the teaching/learning process, and how do we relate technology to meaningful learning experiences? In the morning, Dr. Ken Stevens, Memorial University's new Chair in Telelearning and Rural Education, opened discussion by addressing two key questions: "What is technology and how is it being used?" and "What is the potential for technology?" In the afternoon session, Philip Noel, program coordinator with Vista School District, spoke about the current status of technology in this district.

The fifth roundtable, "Focusing Education on What Students Need to Learn", was held on May 27. The focus of this roundtable was, among other things: what are the critical skills required of students; what are the essential literacies; how do we link our curriculum with the "essential graduation learnings;" how do we ensure that there is a close match between the prescribed curriculum and what is taught; and how do we ensure that we are graduating caring, understanding, ethical and spiritual

human beings? Dr. Glenn Loveless of the Division of Program Development, opened the morning session with a discussion about what students will need to know, with particular reference to the "essential graduation learnings". Dr. Loveless also referred to current initiatives to develop a common core curriculum for Atlantic Canada and how schools and school districts will be affected by that new curriculum. Alex Hickey, also of the Division of Program Development, then spoke about learning, the connection between the curriculum and learning, and what learners need to do.

The final roundtable, "Improving the Coordination and Delivery of Services for Children with Special Needs", was held on May 29. The purpose of this session was to understand such things as: how we organize and manage support services for students, what is the most appropriate environment for a student with special needs, how we better coordinate and deliver services to children and youth, how we ensure early identification of children with special needs, and what staff development opportunities are required. Ed Mackey of the Division of Student Support Services, began the morning session by addressing what is a special need, who has a special need, and what supports are required to serve that special need. Janice Pyne also of the Division of Student Support Services, spoke about critical issues, such as labelling and scheduling, that affect the nature and level of services that can be provided, and about how to determine the most appropriate environment for students with special needs. Finally, Maureen Bethel of the Ability Employment Corporation, provided stimulating examples of ways in which communities can more effectively coordinate and deliver services for children.

While each roundtable was unique in the issues that were being addressed, they all followed a similar structure: a morning session designed to provide contextual information about the issue and a general framework for discussion, followed by an afternoon session designed to facilitate the generation of objectives and strategies that can be used as a guide for the district. It is important to note that the purpose of the roundtables was to create ideas rather than to evaluate them or to build consensus. As a result, during the sessions hundreds of objectives, strategies and suggestions having implications for all facets of the organization and all those affected by it were identified. The challenge at the next stage is to assemble the ideas and suggestions together in the form of a vision statement that is visionary, far-reaching, representative, feasible, and achievable. While the district may not be able to deal directly with every idea expressed at the roundtables, all will be addressed in one way or another either through the objectives and strategies, or the action plans that will follow.

THE NEXT STAGES

The next stages of the planning process include: establishing the priorities, identifying the measures, finalizing the process and structures for the annual cycle of events, and beginning the first annual cycle. The first cycle of events will include action plan development, communication, implementation, measurement, and evaluation. During this time, it will be critical to fully integrate the process with the school's annual planning cycle (school assessment). It is desirable that, at a future date, the planning activities at all three governance levels—school, school district, and Department of Education—will be fully linked.

It is also important that the planning process be evaluated and examined to see what has been learned and what needs to be changed and improved. While it is difficult to assess what has been learned at this early stage, a number of things are certain. For example, we can conclude that this year was not a great time to begin an extensive planning process. On the other hand, given the continuing and unrelenting pace of change in society, it may never be a great time to begin such a process. That being said, with the startup of a new district with new responsibilities and challenges, it is perhaps the best time to plan.

Secondly, the process is demanding and requires commitment. Commitment, however, is not something that can be delegated. It must be built in at every level of the organization. Thirdly, information and analysis are critical. Without information there is no way of telling if the objectives are being achieved or if the strategies are succeeding. Fourthly, the process is not the answer to all the district's problems, but it is a way of anticipating problems. Fifthly, for it to succeed, the process will need to be fully integrated into the district's operations. That will need time to evolve. Finally, it is important to view this endeavor as a continuous journey rather than a one-time event. Ω

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The Open Learning and Information Workshops

Open
Learning
and Information
Network

enhancing skills for the information age

The Open Learning and Information Network (OLIN) is a dynamic provincial network of content and service providers committed to the delivery of learning opportunities through technologies in Newfoundland and Labrador. Its primary focus is to provide greater access to learning opportunities through collaborations and partnerships with agencies and individuals committed to an equitable distribution of resources in the province.

The first in a series of professional development workshops for the partners in the distance education team was delivered on April 10 and 11, 1997. The workshop "Collaborative Learning on the Web" was held at the Marine Institute.

Dr. Elizabeth Burge and Eileen Bragg were workshop leaders. Dr. Burge is Associate Professor of Adult and Vocational Education, Faculty of Education, at the University of New Brunswick. She is past president of the Canadian Association for Distance Education (CADE) and has written many articles on collaborative learning and designing a construc-

tivist learning environment for Canadian and international education journals. Eileen Bragg, an instructor at the College of the North Atlantic, coordinated the Professional Development project - Individualized Professional Development Planning Program - Phase II at the college. Bragg has much experience with adult learning through her work in an English as a Second Language program and through Cabot College's International Program. Bragg is currently enrolled in a doctoral program at the University of Toronto. Workshop participants included faculty, instructional designers, and web designers from the post secondary and private sectors.

The workshop began two weeks prior to April 10 with a pre-conference, online discussion for participants and workshop leaders. Participants introduced themselves and indicated their expectations for the workshop. During the two days of the workshop, participants explored the characteristics of quality web sources for a constructivist learning environment. The first day was used

to discuss theory through facilitator presentations and group activities. The second day of the workshop was used for hands-on computer activities based on the previous days' activities. The topics included:

- diversity in learning styles
- selecting criteria for web-based learning
- creating web-based learning designs
- critical analysis of web course designs

Several participants, who have developed learning materials using new media, shared their designs and experiences gained during the development of the resources.

The second workshop in the series was offered on May 22 and 23, 1997. Dr. Tom Carey from the University of Guelph and the University of Waterloo led 24 public and private sector participants through a two-day workshop entitled, "Designing Learning Activities with Interactive Multimedia."

The workshop started with a pre-conference online discussion.



Tom Carey leads a session in the second workshop offered in the OLIN series.

Participants, working in teams made up of a subject matter expert, an instructional designer and a technical specialist, brought specific instructional challenges to the workshop.

The workshop led participants through the development stages of a project using a learning scenario approach. This approach to multimedia development is learner-centred and the process begins with the identification of an instructional challenge: a teachable moment which consistently fails to become a learning moment. From this instructional challenge, instructional goals are established. Then the project team defines a learner profile of a typical learner they believe will be using the software. Each team at the workshop produced three learner profiles.

The next step in the process is to apply instructional strategies that will lead the learner to a successful use of the interactive multimedia. Carey used the model of learning conversations to illustrate this part of the process. Using various instructional techniques, the learner engages in

instructional conversations: a concept adapted from *Rethinking University Teaching*, 1993, by Diana Laurillard. This model outlines the interaction or conversations needed to direct the learner from concept building to higher order skills of concept application.

After each group established the teaching strategies required for their project, they developed learning scenarios. The learning scenarios, based on the learner profiles, are stories that describe the learners' experiences with the learning support system: what they do, why they do it and how they feel about it. This part of the process emphasized the significance of the learner profiles and the importance for developers to have a clear understanding of the learners who will use the software.

The next session dealt with interaction genres, interface design and design testing. An interaction genre is the orienting metaphor that defines the users' experience. A number of interaction genres were discussed including the field trip model, role

agenda, workshop assembly, laboratory model, event timeline and situation response model. Aspects of interface design were discussed identifying several "do's and don'ts" of interface design. Carey placed great significance on design testing and suggested that developers should test early and test often. He suggested several methods that could be used at various stages in the development process.

In the final sessions of the workshop each group developed mockups of the screens that would be typical of their software and presented their work to all participants. The hands-on nature of the workshop make it a very valuable experience. The opportunity to apply the concepts presented in the sessions helped establish a clear link between theory and practice.

The workshop series sponsored by OLIN has been very successful and more workshops are being planned for the fall of 1997 and the winter and spring of 1998. Ω

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Project Profile

An Easier Way to Find Scholarships

by
Hugh Donnan

High school students aspiring to undertake post secondary studies as well as current undergraduate students now have a new resource to draw upon in their quest for financial assistance. Scholarships Online is a nonprofit project set up as a partnership between Student Affairs and Services at Memorial University and the Canada/Newfoundland COOPERATION Agreement on Human Resource Development. It will provide students with online access to information regarding undergraduate scholarships, awards and bursaries available at all post secondary institutions in Newfoundland and Labrador.

The database will also contain information on scholarships offered by other groups and institutions.

The project began in September 1996, with a full-time Memorial University commerce workterm student acting as project coordinator. The project was developed in several stages: the creation of a scholarship database, the designing of a web page, and the creation of a system for updating and maintaining the web page and scholarship list.

The page features an online questionnaire. Students are asked a number of questions concerning themselves and their educational aspirations. These questions are used to tai-

lor the scholarship list to include only those which a student would be eligible to receive. Often scholarships are not awarded because students are unaware of what is available. In the past, students would have to painstakingly contact each group or institution offering scholarships in order to seek out which are appropriate for them. It is hoped that Scholarships Online will make scholarships more accessible. For example, the questionnaire would prompt students for information regarding whether or not the student, or a relative, is a member of any organizations, the geographic region in which the student lives and other information. This would then customize the response to include scholarships specific to membership (such as those offered by various unions, service groups or businesses) and scholarships applicable to the region in which the student lives. The list would include specific information on scholarships such as application deadlines and scholarship values.

The goal of this project is to make Scholarships Online the "one-stop-site for students" requiring information on post secondary undergraduate scholarships in Newfoundland and Labrador. The project was officially launched on September 19, 1997. Ω

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(Left to right) Judy Casey, Danielle Moran, Hugh Donnan and Dr. Donna Hardy at the official opening of Scholarships On-Line

Literacy for the Twenty-First Century

by
Dr. William T. Fagan

"Reading and writing are necessary but not sufficient for literacy. Reading and writing both involve the construction of meaning via print and prior knowledge. Literacy entails both attitude and action with respect to reading and writing and is influenced by social, economic, political, and cultural conditions."

In a recent study which I completed in rural Newfoundland, when I asked people what "literacy" meant to them, the responses I received depended on whom I asked. Educators generally responded from what they had read in academic books, that literacy was a social act, that it entailed facility with the language code. The general public responded from what they had heard/read through the media, that literacy was synonymous with reading and/or writing, or education, and that the rate of illiteracy in Newfoundland and Labrador was very high.

These responses are not unusual.

However, there is a reality of literacy which is not disseminated through the media, nor by textbooks used in university courses, nor in literacy survey reports. The reality of literacy, a reality that will take us into the next century, is found by studying how people actually use literacy (not how they are assumed to use it), in ethnographic and related research, and in books not part of academic mainstream. Books like *Toxic Literacies* by Denny Taylor, *Protean Literacy* by Concha Delgado-Gaitan, and *Other Peoples' Children* by Lisa Delpit centre on the strengths, the limitations, the leverage, and the constraints of print competence against a "real life" social, economic, and political backdrop.

Literacy, in fact, has become a very confusing concept. In recent years, it took on such an aura that a whole range of disciplines/organizations/groups jumped on the bandwagon. Terms like "scientific literacy",

"computer literacy", "biblical literacy", "business literacy" mushroomed. What is scientific literacy? How is it different from scientific knowledge? What is computer literacy? How is it different from computer knowledge? Does literacy in these instances have a reality that knowledge does not have? No, it does not. The use of literacy in these examples does nothing to change the reality of developing competence in computers or science. The word "literacy" is only part of language hype.

LITERACY: PRINT/WRITING FOCUSED

The heart of literacy is print/writing, and being literate necessitates possessing competence in, and control over the use of print/writing for the purposes of reading and/or writing. However, unless people are interacting in some way with print and relating it to their lives, there is no literacy. Oral language is closely related to



written language and is frequently used in conjunction with written language. Literacy also generally entails competence in and control over the use of oral language.

This may have been a good start in delineating a definition of literacy except that some educators decided to muddy the waters by introducing terms like "basic literacy" and "functional literacy" and others. These terms were coined, not out of the reality of the users of literacy, but out of a need by educators, policy makers, or administrators to structure a particular discipline for management purposes. Would you recognize basic literacy by observing or talking to fisherpersons, farmers, waiters, nurses? Is there a case when literacy is not meant to be functional? Can you imagine an adult in a particular literacy program saying, "Now we are studying non-functional or dysfunctional literacy; we'll be going on to functional literacy next week"?

Literacy occurs in social, economic, political, cultural, family, and religious contexts. Literacy either has or does not have a place for people in these contexts. If it has a place, then it is judged by a person's ability to engage efficiently in completing literacy tasks, not in labelling the person as basic, functional, intermediate, or a Level 2 or Level 3 in literacy. If literacy does not have a place for a person in these contexts, then literacy is not even an issue for that person.

LITERACY: THE POWER BEHIND THE PRINT

Technology has changed the face of the earth and the people on it. People are now more likely to be characterized as impersonal, distant, formal, bureaucratic, regulated, or institutional. There is a contradiction that advances in technology enhanced communication. For example, you can rarely speak to a live per-

son in the business/bureaucratic world anymore, or if you do, you must first endure uninvited music, commercials, and choices. With advances in technology there has been a shift from "literacy" to "power". The ability of administrators/officials to remove themselves from the "front lines" of oral communication is an example. The programming of computers so that notices are issued at regular intervals regardless of intervening interactions is another example of the interference of technology with communication. For example, an insur-

as we are often led to think. Literacy is a medium for negotiating with power - the power of the person on the other side of the print. This could be the official in a government department who has power to resolve an issue, the editor of a newspaper who has the power to publish or not publish a letter to the editor, the business official who has the power to ignore your letter about a business transaction, or the media which has the power to decide what you and I, shall and shall not see/hear. I have elaborated on the power behind print elsewhere (*Literacy in Living*, in press).

Literacy has many uses in society and the extent to which the user must negotiate power varies.

ance policy may have been renewed but if it has not been "entered into the computer", the next notice indicates that you have not paid it, causing endless frustration for people. As a third example, when a mistake occurs against the best interests of a customer, the computer is often blamed. Yet the computer is always right.

Years ago, it was not uncommon to hear the elders of a community encourage young people, "You must get your grade eleven", "You must get an education." Now these exhortations should be "You must get a power position." Literacy is not power today,

LITERACY: THE POWER BROKER

Literacy has many uses in society and the extent to which the user must negotiate power varies. For example, if a person wishes to read a mystery, then there is very little necessary in the way of negotiation. The user has the power in this case; if the mystery is not interesting, if the language is confusing, the reader can just put the mystery aside. If the user must negotiate with bureaucracy, business administration, officialdom, then the power structure changes. The user must now become an agent of literacy, a power broker. While literacy, as pointed out above, entails competency in print (understanding what is read, word recognition, use of different patterns/organizations of writing, appropriate spelling), that is not sufficient for being literate in the 21st century, for being a power broker. A person must also have control over print and its uses. This entails more than understanding a text passage and recognizing words. It entails possessing literate knowledge of:

- why something has been written (such as the rules and regulations to qualify for TAGS income)
- what effect an author intended to

The literacy user must be aware of the pitfalls of language use, of emotional language, language biases, the logic and contradictions of language.

have

- how information through print affects or may affect the reader's life
- what particular goal through writing does a person intend to achieve
- who has the power (exactly which individual in the organization) to make that goal possible
- what is the power structure and the political structure of the organization
- what recourse does the person have if the power behind the print blocks the attainment of the goal?

The literacy user must be a critical and insightful thinker. Using literacy for attaining goals is not unlike a lawyer arguing a case in court. The literacy user must be aware of the pitfalls of language use, of emotional language, language biases, the logic and contradictions of language. Literacy for the 21st century is far from being a passive act; a literate person must be an active participant in literacy events.

LITERACY FOR LEADERSHIP

Many communities in rural Newfoundland and Labrador are in danger of not surviving. Among other factors, strong leadership is essential if they are to survive. While drive, energy, commitment, time and even

charisma are vital to leadership, a leader must be able to deal effectively with the "powers" and this always entails the use of print (reading and/or writing), and /or oral language. Leaders cannot function effectively with literacy that was suitable 15 or 20 years ago. Not only must leaders be active participants; they must be proactive participants.

This means a new kind of literacy program (sometimes such a program may be intertwined with Adult Basic Education programs). This kind of program must be interactive in nature. It cannot be focused on individual instruction or task completion; it cannot be computer-driven. It cannot be restricted to word decoding/recognition and simple comprehension. It must be a program where instructor/tutor and learners

think, challenge, reflect, review, plan and act. Not to provide programs that prepare people in general, and leaders in particular, for literacy for the 21st century, is doing them a great disservice. Delpit (1993) argues this point very strongly. She states that no educator has the right not to allow learners access to the kind of education, the kind of literacy which they need to compete with others. She would consider it an injustice to set as a goal for an adult learner, the attainment of basic skills in reading and writing. All adult learners, if they are enrolled in literacy programs, have the right to become literacy power brokers - to become empowered in their competency in and control over language.

The literacy of the 1960s, 1970s, or even 1980s is no longer sufficient for the literacy demands of the 21st century. Literacy has moved beyond the realm of print to the realm of power. If literacy programs are to have any significance for adult learners, then the literacy they acquire must be that which will take them into the 21st century. Ω

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Is Technology Changing the Culture of Learning?



by
George Haché

As a concept, the term culture connotes an abstract set of valued attachments or norms related to commonly valued conditions, and even artifacts. Often associated with an endearing reverence for art, performances, and literature, the term reflects other attributes such as persistence, endurance, or perseverance found in individuals and communities. These words and others have been used to describe past cultures of a community or group. Often the mix of such attachments and their associated behavior provides the basis of the development and depiction of cultural icons which we use to measure a group's cultural growth.

Although cultural attachments are generally most valued in those communities where they reside, they are both conspicuous and a curiosity to others that do not ascribe to them. We see cultural references in connection to local, regional, and national settings and find those international cultures, or inter-cultural determi-

nants are less evident.

Historically, work and technology have been attachments used to describe culture. The result of technology and work, be they vases or prints, silk cloth or orchestration, has been generally acceptable in depicting culture and the thought of separating the prevailing technology from references used to define any group's culture is not tenable. Just consider our reverence for artifacts of the past such as 16th century European masters, or the vessels and cuneiform of ancient Egypt (<http://eawc.evansville.edu/index.htm>).

Interestingly, those who fashioned artifacts likely regarded their contribution as work, whereas today we value them for their contribution to art, achievement or skill. In an article entitled, "Wheel of Culture", Ben Davis found technology compelling us to ask all manners of questions when we take a very explicit look at the world in which we live, a place of finite resources. Current technology is

facilitating both the means and the information for discussion on such matters and also serves as a depository for the content. (<http://www.mit.edu:8001/people/davis/Wheel.html>). A comprehensive view of changes to work and learning and their effects on our culture is increasingly apparent, primarily because of the growing aggressive presence of information technology.

Among the attachments that describe our present culture, advancing information technology and learning are not separable in the plenum of technological advancements. Neither is the extent to which individuals immerse themselves in learning technology distant from greater access to information. Those who have accepted technological advancements into their personal and work lives receive benefit from the assimilation of information and are compelled to continue using technology.

In his article, "Technology Refusal and The Organizational Culture of Schools", Steven Hodas points out that the insatiable need for technology has schools advocating "outside" agendas often defying their own values and culture. By using technology in an unquestioned fashion, schools participate in the technologists' sense of instrumentalism. If learning is in the mix, and the process shifts from a former metaphor, dramatic effects to the culture of learning may occur.

We move from teacher and control focus to learner and process orientation. Work and education help us capture this view. Both settings are currently collecting greater amounts of information using processes that continuously interact. They involve activity that is not centrally directed nor used by one individual; rather the practices require group interaction on specific sets of tasks. Exclusiveness, information scarcity and central control will likely diminish as such conditions continue to grow.

The challenge is to organize learning environments where individuals can participate in such communal activity. More information on Hodas is available at the following site. http://www.cpsr.org/cpsr/conferences/cfp94_papers/HODAS.

Learning to use the newest technology to perform a host of tasks more quickly is characteristic. There is a general acceptance of new technology, sometimes without question, as we place increasing confidence in technology, and this is not unrelated to exposure. Often the learning activity is refocused on other conditions because of the presence of technology, such as accessing information about projects, communicating with individuals in distant locations, and combining these two for group learning.

As learners become dependent on increasingly sophisticated technology, they defer many complex tasks and decisions to the systems developed to expedite the requested services. Sue E. Berryman of the Institute on Education and the Economy, Teachers College, Columbia University, reviewed the impact of this in her article entitled, "Designing Effective Learning Environments: Cognitive Apprenticeship Models" (<http://www.ilt.columbia.edu/k12/livetext/docs/berry1.html>). She indicates that cognitive apprenticeship models change as we gain experience with new technology and the bruising real world of teaching and learning.

In an article entitled, "Learning to Write Together Using Group Ware", Alex Mitchell, Ilona Posner and Ronald Baecker observe the learning process in relation to group writing and identify some of the effects of using collaborative writing tools. They found that students who worked together developed distinct, mature strategies for group development and a synchronous capacity for learning and writing in general. This can be reviewed at the



following site: <http://www.dgp.toronto.edu/people/alex/publications/CHI95.html>.

It follows that both policy and technology will be in question as increasing pressure is placed on educators to use technology to offer different education models and the number of tutorial sessions using telecommunications technology increases in schools and at home. If we consider the growing competition in this field, an alternative focus on learning and training may be needed, particularly for those resources that promote the public interest.

A globally accessible electronic learning capability opens interesting possibilities and serious challenges for educators. Ponder the following concepts in relation to the culture of learning most familiar to you:

- The creation of information communities that provide households with access to advanced universal information services
- The benefits and non-regulatory barriers on universal learning provisions
- The provision of greater access for underserved populations
- The role of public institutions in relation to homes being linked to the information highway
- The provisions of greater knowledge access to advance the capability to better identify barriers to participating in telelearning
- Greater access to knowledge of strategies that could be used to build advanced technological learning situations
- The crystallization of protection for learners/users in the learning mar-

ketplace that has currently no controls and boundaries

A site entitled Cyber-Rights (<http://www.cpsr.org/cpsr/nii/cyber-rights/index.html>) offers access to such information, alerting viewers of the forces involved in the development of cyberspace. It also provides information useful in promoting individual rights in the world wide infor-

the professional development of teachers. She also concluded that fundamentally "technology doesn't change education" as the processes of learning fundamentally reside in social interaction. Rather the technology provides both greater access to audience and purpose of learning [http://bolt.lakeheadu.ca/~faced-www/Kerlin/Riel.html](http://bolt.lakeheadu.ca/~faced/www/Kerlin/Riel.html). In most instances such conditions can be taught, acquired and collected. See Bill Hemming at: <http://eawc.evansville.edu/index.htm>. Ω

It follows that both policy and technology will be in question as increasing pressure is placed on educators to use technology to offer different education models ...

mation age.

In all, we cannot ignore the fundamental question of this column. It is perhaps best summarized by Dr. Margaret Reil in her lecture focused on children, learning and computer mediated communication. In describing her views of research conducted on interactive technology since 1980, Dr. Reil indicated that although advancing technology was often found to be indistinguishable from magic, the use of inter-cultural learning networks resulted in positive effects on both student skills and on

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In Future Issues of Prospects

The next issue of *Prospects* will focus on partnerships between educational institutions and business. The Winter 1997 issue will deal with education and the Internet. Please send submissions on this or other topics relevant to human resource development to the editors at the address found on the last page. Your submissions will be carefully considered for publication.

Submissions to the Editors

An important mandate of this journal is to establish a forum for discussion on issues that are of concern to individuals involved in the human resource development industry. We welcome your letters, comments, questions and submissions and will consider them carefully for publication in future issues. If there is any particular theme that you would like us to develop or aspect of the industry you would like us to explore in depth please let us know. We can be contacted by mail, telephone, facsimile or email at the following address:

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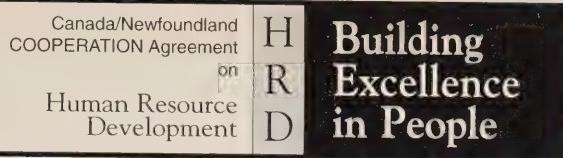
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We would like to extend our heartfelt congratulations to Claudette and Steve Hillier on the recent birth of their baby boy, Jarod Dwayne.

COOPERATION



The COOPERATION Agreement on Human Resource Development

Signed in January 1993, the Human Resource Development (HRD) Agreement is built on the principle that economic development depends upon building excellence in people. This five year, \$42.9 million federal-provincial Agreement is a catalyst for long-term change in this region of the country. It strives to collaborate with school boards, community colleges, and business, labour and community organizations to initiate improvements. While the Agreement is future-oriented and looks at key variables to make Newfoundland and Labrador competitive in the national and international market, it is also sensitive to the emerging demands and the climate of the current labour market. The goals of its programs include: improving achievement and participation in science, technology, and mathematics; improving written and verbal communication skills; helping educational and training institutions respond to the needs of small business, and encouraging a cooperative, working relationship between education, business and industry.

To further the economic and human resource development goals of the province, four main programs were developed. The first program, Learning and Enterprise Culture, is designed to enhance school improvement efforts, support community and enterprise education, as well as provide programming for high achieving students. The Strategic Knowledge and Skills program promotes problem-solving skills, knowledge of science and mathematics, communication skills and entrepreneurial abilities. The program entitled Capacity Building is designed to help training institutions develop curriculum in strategic sectors and to encourage teachers to improve professional qualifications and classroom resources. The fourth program entitled Learning Together encourages industry and learning institutions to exchange personnel and build a more effective partnership between education and industry. Finally, the Research and Planning program addresses the general research and planning needs identified under the Human Resources Development Agreement.

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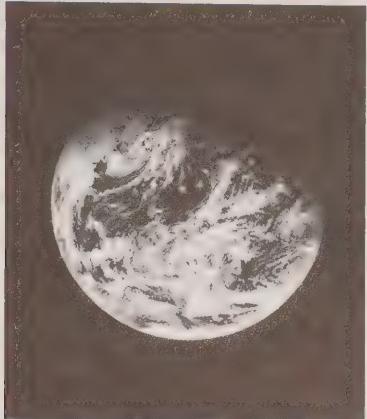
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A Borderless Perspective



The perspective from space provides us with a unique view of our world and ourselves.

These images give us an opportunity to view our planet without political borders and other representations of ownership that pervade our maps. This view can be disquieting. Our little blue planet is alone, suspended in the darkness that defines the limits of its resources. From this perspective the importance of our environment and the need to carefully manage it become abundantly clear. But the realization of the finite nature of our planet presents possibilities and can create the desire to cooperate and learn from each other. One of the most significant manifestations of the desire to cooperate and communicate is the Internet.

Pictures of our planet from space provide us with a borderless view of our world. The Internet breaks through traditional boundaries by providing us with borderless communications. The Internet was first developed in the late 1960s when the U.S. Department of Defence created a network called the Advanced Research Projects Agency Network (ARPANET). The ARPANET provided certain research agencies doing Department of Defence work with access to hardware and software the agencies could not afford. An additional goal was to create a system that

could still send and receive data if a part of it had been disabled. In the last 30 years the Internet has grown substantially and currently offers significant commercial and educational opportunities.

In this issue of *Prospects* we explore some of the methods we employ to respond to this potential. STEM~Net has made it possible for teachers in Newfoundland and Labrador to take advantage of the Internet to communicate freely with colleagues, enhance their instructional strategies and keep up on current trends in education. Nancy Parsons-Heath offers an article that describes the details of the recent evaluation of STEM~Net and outlines the next phase of services to educators, schools and students. Ken Stevens, Chair of Telelearning in the Faculty of Education at Memorial University, describes the place of telelearning in the development of rural schools. Other articles highlight innovative uses of new communications technologies by educators and students.

The Canada/Newfoundland COOPERATION Agreement on Human Resource Development ended on March 31, 1998 and this will be the last issue of *Prospects*. Trudi and I have greatly enjoyed working on this project. The HRD Agreement funded 596 projects over the five year period. What made this program special was

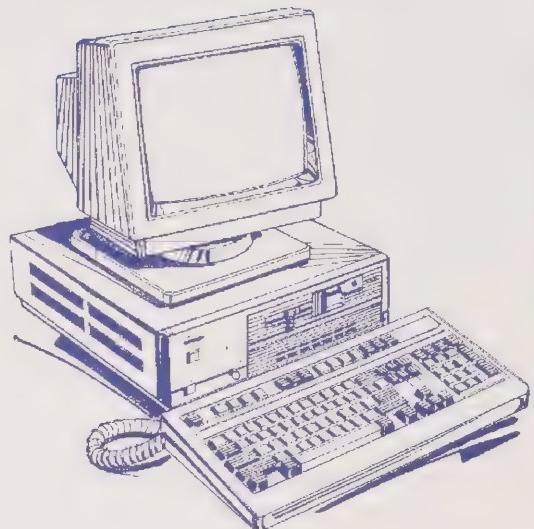
the outstanding participation from dedicated educators, administrators and staff who created the project concepts and implemented the many new initiatives that are the hallmark of this Agreement. We would like to thank all the people who graciously received us as we travelled the province to collect stories for the journal. It was a pleasure to meet and work with so many energetic and inspired individuals.

Our work with the *Prospects* advisory board has been very rewarding. We would like to thank Nellie Burke, Randy Devine, George Haché, Hayward Harris, Claudette Hillier, Elizabeth Montgomery (D. Apr/97), Harold Press, Anne Marie Roche, Carol Ruby, and Charlotte Strong for working on the journal's advisory board. A special thank you is extended to Claudette and Nellie for their support and help with the journal, and to George for his diligent work and research in writing the Technology and Education column. We would also like to extend thanks to our readers. Your support and words of encouragement over the past four years have been greatly appreciated.

Trudi Johnson
Albert Johnson
(editors)

Reviewing Contributions by Newfoundland and Labrador Students

by
George Haché



In developing this last column for Prospects, I was compelled to reflect back on the events that have occurred in Newfoundland and Labrador schools since the onset of the COOPERATION Agreement on Human Resource Development and my involvement with Prospects. In my first column there was a degree of reflection on international events that originated elsewhere. In the last of the series, I find it fitting to reflect on international events that have occurred in Newfoundland and Labrador schools. Like many individuals who have been involved with the technology made available through the projects supported by the HRD Agreement, there have been many situations that have provided me with a measure of satisfaction. Among

these were projects that left a distinctive impression, both in the past and will likely continue to do so for an indefinite future. My positive impressions resulted from the connections individuals made to information sources that were featured on many pages that students have designed and featured on the World-Wide-Web (WWW). I have not only enjoyed reviewing these pages, but also received numerous email messages that were directly related to the information provided on Newfoundland and Labrador students' Web pages.

In a recent email from an acquaintance who resides in another province, I was asked to provide information that was needed by a master of ceremonies (emcee) who was planning an evening's dinner

entertainment featuring a Newfoundland theme. He sought information that could be used to add flavour and backdrop for a guest speaker who was to describe an archeological project being conducted here. The individual was seeking the usual: local recipes, popular phrases, unique words, some jokes, and the like. It appeared that novelty, brevity, satire, pop wisdom and other unique cultural descriptions might easily satisfy the request. I immediately began to look for popular sayings, a couple of jokes, and a recipe or two, whatever might point to highlight characteristics of the region. On the surface the request did not appear to be an onerous task.

Then I recalled having attended several functions with a resident in the same province from which the

request originated, I realized that backdrop information and jokes rarely depict the unique characteristics of the province in which I reside. I feared, as had occurred most often at such dinners, that the speaker and emcee would resort to one liners or a bunch of guff jokes. I decided to look differently at the request and began to seek out information that would entertain but also be representative of the culture to be depicted by the speaker and emcee.

I remembered visiting a number of Web sites that had been developed by local students who were sharpening their skills at making home pages. Many featured unique information on rich projects. Some of these were thematic in nature and provided amazing collections of stories and other information that student designers had deemed important. With the use of a browser and a few search words such favourite food, recipe, culture, history, special events, Newfoundland, Labrador, heritage and others, all in various search combinations, I was soon able to locate a rather impressive collection of Web sites that I used to compose a reply to the email request. My collection of sites contained numerous links that featured favourite recipes, historical accounts, popular music, local stories and dramatic accounts of individual lives. I found myself jumping from one school to the next to get better acquainted.

The dinner speaker and emcee eventually received more than they had requested. They used the information to create a more positive and insightful impression of the province for those who attended the event. The emcee later emailed a thank-you message to indicate that the sites that had been created by Newfoundland and Labrador students were indeed impressive and served to better reflect the nature of, and drama in

Newfoundland and Labrador life. It led to a portrayal of the region as it was, and had been, and not an interpretation that would have otherwise been restricted to trivial episodes, jokes, and trite quotes.

On yet another occasion I received email from an individual who is related to a commanding offi-

*In the wake of
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technology and
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Newfoundland and
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a growing number
of students are
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accessible to others,
and in many cases,
internationally
recognized.*

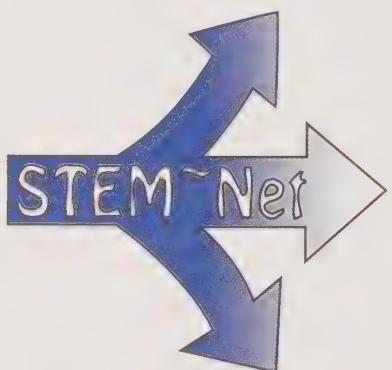
cer who was assigned to one of two warships that sank off the southern coast of Newfoundland during the Second World War. The two ships, U.S.S. *Truxtun* and U.S.S. *Pollux*, sank in 1942 near the Burin Peninsula with a loss of many young American sailors. The individual had been reviewing a WWW page that

contained stories of infamous Newfoundland shipwrecks and a short story of the two American warships. He has been searching to collect historical accounts that might include information regarding his grandfather's commission and its eventual demise when he came across the students' pages. One of the students from the group and I had a previous email exchange, when he was collecting information on Newfoundland shipwrecks and sought a scuba diver's views of the underwater wreckage. I responded to his email message with the information he requested. The student colluded with others in his group to eventually develop a series of Web pages that featured notable shipwrecks. Apparently the grandson of one of the ship's skippers had located the student's page when he conducted a Web search of the ship's name, and through the pages found the email exchange I had with the student that described the sunken warship. The grandson then proceeded with an email message to me seeking further details regarding the wreck and other dive-related information. I never met any of the individuals involved. My role was limited to simply passing on information that was sought by others.

The circumstances of these stories are similar to many others I have experienced in recent years and serve to illustrate the dramatic changes that have occurred for many students. In the wake of rather extensive deployment of technology and expertise in Newfoundland and Labrador schools, a growing number of students is becoming more accessible to others, and in many cases, internationally recognized. The most recent acknowledgement of Newfoundland-Irish collaboration on the WWW by the Canadian Prime Minister and Queen of England illustrates the drama (continued **STUDENTS** on page 32)

STEM~Net:

The Next Phase of Services to Educators, Schools and Students



by
Nancy Parsons-Heath

J une 1st, 1998, marked the beginning of a new phase in STEM~Net's life.

Administratively, it was transferred to the School of Continuing Education at Memorial University from the Office of the Vice-President (Academic), which had been responsible for it since its inception in 1993.

Functionally, STEM~Net will continue to be the servant of the K-12 educators and their students in every school in Newfoundland and Labrador. Policy will continue to be set by a Board of Directors with formal representation from the Department of Education, the School Districts, the Newfoundland and Labrador Teachers' Association and the Faculty of Education of Memorial University, with the Board Chairperson selected from one of these stakeholders. The Board also has representation from private sector partners and the community at large.

STEM~Net underwent two types

of external evaluations between December of 1997 and February of 1998. In the first, Omnifacts Limited carried out a telephone survey of 440 teachers, selected randomly from the total population of teachers, with detailed questions covering the areas of access, activities, uses, value, and future network needs.

The Omnifacts survey found that levels of teacher access and usage greatly exceeded the expectations outlined in the initial STEM~Net proposal early in 1993. The survey indicated that more than 85% of respondents currently have access to the Internet, and that nearly 80% of users access the Internet on at least a weekly basis. Electronic mail was found to be the most frequently used method of communications with other educators. Usage levels were found to be similar for different teaching subject areas, urban vs rural, and lengths of time in teaching but were found to be higher for males.

than for females. The results suggest that STEM~Net has made a great deal of progress towards its goal of reducing the isolation experienced by educators in this province. The survey also found that many users, particularly those in rural long-distance areas, continue to experience access problems of one sort or another, something that will continue to be a challenge to STEM~Net and to telephone services in rural areas.

Omnifacts also found that teachers do use STEM~Net to access online resources, primarily through the World-Wide-Web. About 80% of users draw directly on the STEM~Net Web site, more than 60% use the SchoolNet site, and more than 75% use other Web sites. Interestingly, nearly one-half of users also access online newsgroups. Nearly 90% of users indicated that their use of information and communications technology for teaching purposes has increased in the past four years. Teachers in STELLAR schools used the Internet more than other teachers to obtain information for classroom teaching, and were more likely to have their students make use of the Internet for curriculum-related activities. The survey did not find any significant difference in teacher access for teaching purposes across subject area lines, grades taught, or gender. However, secondary school teachers were more likely than primary and elementary teachers to require their students to use the Internet. In addition to teaching, a large majority of respondents to the Omnipacts survey indicated that they have used the Internet for some form of personal or professional development.

Most respondents suggested that the introduction of STEM~Net and the Internet has had either some impact (nearly 60%) or a large impact (about 30%) on improving student achievement to this point. Among

respondents who suggested that the introduction of STEM~Net and the Internet has had no impact on student achievement, the most common explanation given was that there is a lack of access for students.

The results of the Omnipacts survey suggest that more than 95% of respondents with access to the Internet received some form of train-

Omnifacts to indicate which services or resources they would like to be available on the Internet for educators in the future. The most frequently mentioned were that there should be more up-to-date information and materials available, that things should be made easier to find and that there should be more teaching aids.

The second external evaluation was carried out by the Memorial University Centre for Telelearning and Rural Education, and consisted of interviews with educational, network and community leaders in the province. It addressed STEM~Net's Missions and Goals; Programs and Projects; Communications, Connectivity and Services; Professional Development and Training; Administration, Leadership and Partnerships; and other topics. Each of these areas was reviewed during the interviews and the participants' responses summarized.

The majority of the participants agreed that the development and implementation of STEM~Net was consistent with its mission as originally stated. It was noted by many interviewees that the mission did not include student learning; however, STEM~Net has evolved over the past four years to include a significant number of students who are participating in a variety of curriculum projects.

The majority of those interviewed agreed that the programs and projects developed and implemented by STEM~Net and its partners have enhanced the teaching and learning in K-12 schools. There was a very high degree of support for the STELLAR Schools program; however, there was a need expressed for a similar program for small rural schools that are not serviced by Cable Atlantic Internet.

The majority of participants did not feel that the communications,

The majority of those interviewed agreed that the programs and projects developed and implemented by STEM~Net and its partners have enhanced the teaching and learning in K-12 schools.

ing in its use. The majority received their training from lead teachers who had been trained by STEM~Net. The respondents gave the training a generally positive rating. A large percentage stated that the quota system should provide more online hours, that there should be more computers available for access, and that there should be more training, in general.

All respondents were asked by

connectivity and services facilitated and coordinated by STEM~Net and its partners have been achieved on an equitable basis in all schools. There was general agreement that communications and connectivity were not equitable between the larger urban schools and the smaller rural schools throughout the province. The majority of the interviewees agreed that STEM~Net and its partners have been instrumental in improving educational networking among all primary, elementary and secondary educators in Newfoundland and Labrador. The majority also agreed that the professional development initiatives organized, conducted and facilitated by STEM~Net and its partners of educators have been very effective. In the meantime, the need for additional professional development and training activities was also raised.

It was the unanimous opinion of those interviewed that the administration of STEM~Net has been both efficient and effective. Furthermore, there was general agreement that the STEM~Net staff is a very enthusiastic, professional and competent team. The majority also agreed that the public and private partnership model has enabled STEM~Net to provide more comprehensive programs, projects and services for both teachers and students than was projected in the original planning in 1992. It was generally agreed that the STELLAR Schools program, which is a partnership between STEM~Net, Cable Atlantic and the school districts/schools, is a model of excellence in partnering between the public and private sectors.

STEM~Net has initiated, facilitated and coordinated programs outside of its original mission and goals. In the evaluations, there was considerable support for the development and implementation of programs and projects that focus on student learn-

ing. A Strategic Planning Sub Committee of the STEM~Net Policy Advisory Board is now in the process of developing a new mission, mandate and three-year strategic plan for STEM~Net that will outline, in general terms, its roles in supporting K-12 network activities for the next three years. This process will build on the evaluations that have been completed. It will also chart a course for STEM~Net that takes advantage of the experience and strengths that it has built up over the past five years and will allow STEM~Net to best serve the needs of K-12 education in Newfoundland and Labrador in the future. Ω

Project Partners:
AT&T Canada (Newfoundland)
Cable Atlantic
Digital Equipment Corporation
Keyin Technical College
NEWTEL Communications
Marine Institute
Memorial University of Newfoundland
Industry Canada
Department of Education
Newfoundland and Labrador
Teachers' Association
COOPERATION Agreement on Human Resource Development

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STELLAR Schools program launched in Ireland

Students exchange projects via the Internet

STEM~Net and Cable Atlantic have crossed the Atlantic Ocean with their STELLAR Schools program! STELLAR Schools has been providing Internet access to students and educators in Newfoundland and Labrador since 1995, with close to 200 schools involved to date.

The program encourages teachers and students to bring technology into the classroom by doing curriculum-related projects on the Internet. Now, the STELLAR Schools program is up and running in Waterford County, Ireland.

Several schools in Newfoundland have been twinned with schools in Ireland to work on a variety of projects, including an analysis of Newfoundland and Irish sayings, an exploration of historical cultural links, creative writing exchanges and the development of Webpages. Those projects are featured at this site.

The personnel at Cable Atlantic met with individuals in Ireland's Information Technology sector during a provincial trade mission. They realized that the STELLAR Schools model would be a great way to help increase the level of technology in Irish schools.

The project was officially launched on May 20, 1998, in officially simultaneous ceremonies at Booth Memorial High School in St. John's and Newtown Secondary School in Waterford City, Ireland.

The Place of Telelearning in the Development of Rural Schools in Newfoundland and Labrador



by
Ken Stevens

In the 1997-98 school year there were 391 schools in Newfoundland and Labrador, 260 of which are located in rural areas. This means that almost two-thirds of all schools in the province are rural and many of these are small and located in isolated communities. The provision of education in rural schools is a matter of considerable importance for government, teachers, students, teacher educators and for many people who live beyond the major centres of population in this part of Canada.

Many rural schools in Canada and other countries with significant non-metropolitan populations have experienced problems retaining students at the senior secondary level. A lot of these institutions are getting smaller as people seek educational and vocational opportunities in other places. In Canada, as in other countries, various approaches have been tried to ensure that rural students are not disadvantaged because of the location of their homes. Sometimes

small schools are consolidated and students are taken by bus from their homes to larger, centralized institutions, particularly at the secondary school level. Distance education is also an established way of providing rural students with access to learning opportunities.

In the late twentieth century a new option is emerging for rural students and their families through telelearning. Telelearning is a new term for most educators. Most people are familiar with distance education, a term that is often confused with telelearning. Distance education and telelearning, however, differ from one another in a number of ways. Distance education is usually paper-based, dependent on postal services and centralized in specialized institutions from which teaching to dispersed learners is organized. A key feature of distance education is that it is teacher-centered and learning materials are largely organized, packaged and delivered by the teacher to dispersed learners.

Telelearning uses telecommunications technologies for the delivery of education and is usually not paper-based but delivered through the Internet. Students and teachers often have a different relationship in a telelearning environment than they do in a distance education one. Through the Internet, teachers and students can interact in a variety of ways: through text, audio, graphics, video and, of course, email. Many students interact with other telelearners through the Internet. The most significant difference between telelearning and distance education, however, is not in the technologies that are used - after all, many distance educators use technologies in the organization and delivery of their courses - but in the relationship to information and knowledge. In a telelearning environment students have, in many cases, unprecedented access to information from the Internet. This is very different from a rural student who is taking a distance education course without access to a good local library. The information he or she needs to complete a distance education course is usually bound and delivered in a set of course notes, often photocopied by the teacher from a variety of journals and books. In a distance education course the teacher usually prescribes for the learner what has to be learnt in this way.

This is not to say that distance education students cannot or do not seek additional information from other sources. Many are encouraged to read beyond their 'print package' and are rewarded for doing so, but the heart of this type of course is the set of course notes and readings mailed to the student by the teacher through a distance education centre. To a very great extent, the distance teacher therefore prescribes what has to be learnt and defines a body of knowledge to be mastered by the student.

The telelearner often has a different relationship with the teleteacher from that of a distance education instructor and his or her students. Through the medium of the Internet, the student can gather information from a growing number of places in more areas of the curriculum. The teacher does not need to assemble extensive printed materials for the telelearner. The teleteacher and the

advanced telecommunications infrastructures, telelearning is confined to certain parts of the world at the present time. Teachers and learners in Canada, the United States of America, the Nordic countries, Australia, New Zealand, the United Kingdom and much of Western Europe are able to interact through telelearning because they have access to modern telecommunications technologies. The introduction of telelearning, though, is more than just a telecommunications infrastructure. Its introduction often reflects a changing education and policy environment. Telelearning enables education to be delivered in new, flexible, often individualized ways that challenge many traditional educational practices. Telelearning has particular significance for teachers and learners in rural communities as well as for educational administrators and policy makers. In many of the above countries, telelearning is most advanced in rural areas.

At a time when information and communication technologies are developing rapidly and merging with one another, there are other ways of amalgamating schools and avoiding the long bus and ferry rides that so many students from rural areas have accepted for years. By linking schools electronically, using the Internet, satellite dishes and other contemporary technologies, teachers and learners can interact without leaving their communities. In this way they can become participants in virtual schools.

There are a variety of ways of organizing telelearning and virtual schools. In Finland, a direct link between a school attached to the Faculty of Education of the University of Helsinki (and located in that city) is linked by audio and video to a village school in Finnish Lapland, in the small community of

By linking schools electronically, using the Internet, satellite dishes and other contemporary technologies, teachers and learners can interact without leaving their own communities.

telelearner are part of the 'information society.' The sheer volume of information facing many telelearners using the Internet means that the teleteacher is often called upon to help the student select and organize what he or she finds there. The teleteacher is often, then, a consultant to a body of knowledge; distance education teachers usually package and dispense knowledge.

Because of its dependence on

Kilpisjarvi. Teachers from the school in the capital as well as their colleagues in the far north exchange lessons and their students electronically enter one another's classrooms daily.

In New Zealand, audio conferencing has been found to be an inexpensive and effective way of linking schools on diverse sites through which students at the senior secondary school level in rural communities can be taught together for specialist subjects such as Economics, Japanese, Agriculture and Spanish. None of the participating schools has sufficient students to justify the appointment of a fulltime teacher in any one of these subject areas, but collectively, through electronic linking to form "virtual classes" they can collaboratively provide learners with an extensive curriculum. Specialist teachers are shared with other schools in an electronic network and each participating institution consults all partners before making a teaching appointment to avoid duplication of human resources.

In Iceland, all schools have been linked through the Icelandic Educational Network (Ismennt) since 1989. Iceland and Newfoundland have some obvious similarities. Both are islands that traditionally have had fishing and the production of fish products as the basis of their economies. In Newfoundland and Labrador the development of STEM~Net has provided increased opportunities for teachers (and, indirectly, through them, to students) who live in rural parts of the province. STEM~Net links teachers in almost every school in Newfoundland and Labrador and has introduced many members of the profession, like their counterparts in Iceland, to the realities of the 'information society.'

Memorial University of

Newfoundland recently established The Telelearning and Rural Education Centre in the Faculty of Education, an initiative that reflects the University's role in the provision of teacher education in a province containing many small schools in diverse rural communities. The mission of the Centre for TeleLearning and Rural Education is to facilitate research and development with a special focus on the effective utilization of telecommunications technologies in teaching and learning in small rural schools throughout the province. In partnership with the Department of Education, the school districts, the Faculty of Education, and the Newfoundland and Labrador Teachers' Association, the Centre for TeleLearning and Rural Education will:

- Coordinate research in the areas of telelearning and rural education in Newfoundland and Labrador;
- Conduct research related to the instructional design of senior high school courses for delivery by telecommunications technologies in Newfoundland and Labrador;
- Facilitate the design and delivery of professional development institutes for teachers in small rural schools throughout Newfoundland and Labrador, and;
- Coordinate the development of Centres of Excellence in TeleLearning in Newfoundland and Labrador.

Research is currently underway into the effective teaching of Mathematics, Science and Social Studies using telecommunications technologies in High Schools in rural Newfoundland and Labrador. The application of telecommunications

technologies has considerable potential for providing new teaching and learning opportunities for many communities in the province. Ω

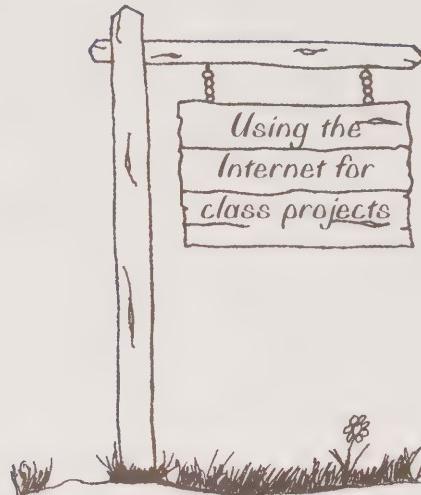
Project Partners:
Memorial University of Newfoundland
Department of Education
Atlantic Canada Opportunities Agency
Industry Canada
COOPERATION Agreement on Human Resource Development

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The Canada/Newfoundland COOPERATION Agreement on Human Resource Development concluded on March 31, 1998. A CD ROM summarizing the accomplishments of the Agreement is being developed. The multimedia package will contain video of various projects, electronic copies of each issue of *Prospects*, an annotated list of the 596 projects funded by the Agreement and other information concerning the program. The multimedia CD ROM will be completed by September 1998. The CD will be distributed to individuals and institutions on the *Prospects* mailing list. Copies will also be available at:

Department of Education
P.O. Box 8700
St. John's, Newfoundland
A1B 4J6
Telephone: (709) 729-1061

SchoolNet's GrassRoots Program



SchoolNet is a Federal/ Provincial/Territorial and Industry initiative developed to introduce K to 12 school students and teachers to the Internet, and to enhance educational opportunities by making national and international resources available to them. GrassRoots is just one of the many programs sponsored by SchoolNet.

The GrassRoots Program is supported by provincial partners and corporate sponsors. Provincial and territorial partners include Newfoundland and Labrador, Prince Edward Island, New Brunswick, Saskatchewan, Northwest Territories and the Yukon. The provincial and territorial partners manage the GrassRoots Program within their jurisdictions. They evaluate the projects according to provincial curriculum needs as well as to the program's national criteria. In Newfoundland and Labrador STEM~Net administers the program. Beth Power, the program officer with STEM~Net, says that GrassRoots is a great success in our province. One-third of the approximately 360 projects nation-wide have originated in our province's schools.

GrassRoots projects are a unique and valuable resource. They are designed by teachers for the specific needs of their students. The program

also provides a vehicle to help in the implementation and integration of information and telecommunication technologies at the classroom level.

Schools that participate in the program receive \$300 or 40 hours of extra Internet access in 1-800 SLIP areas, for each Internet-based, interactive project they run. There are three criteria that projects need to meet in order to be accepted into the program. First, the projects must be curriculum-based. It is important that the experience be part of the teacher's existing plan and not be an additional drain on classroom time and resources. Secondly, the students must be in contact with people outside of their immediate environment and finally, each school must complete a project Web site. The duration of the projects is usually three to four months but some take longer.

The STEM~Net Web site contains numerous GrassRoots projects from primary, elementary, intermediate and high school levels. At Brinton Memorial in St. John's, grade three students developed a Web site that documents their study of squid. The grade two class at Fatima Academy in St. Brides set out to collect favourite fairy tales from various parts of the world. They contacted schools in the United States, Japan

and other parts of Canada. Their Web site contains links to many of these schools and information about fairy tales. At Holy Redeemer School in Spaniards Bay, grade eight French Immersion students are communicating online with French students in the United States on curriculum-related topics. At Jakeman All Grade in Trout River, students have established a Web site called the Electronic Postcard to help students around the globe study world cultures.

"The projects have been a great experience for the students," says Power. "They get excited about writing for a broader audience which encourages them to put considerable effort into their work." Ω

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Publishing Web-based Curriculum Documents

by
Alex Hickey

Publishing is no longer a matter of creating a document in print. The Internet has opened doors to alternative methods of document creation and publishing.

Traditional linear sequenced documents are now joined by non-linear, user-defined Web-based format.

In an effort to make documents as useful as possible and available to all those who may have use for them, the Division of Program Development in the Department of Education will publish all future curriculum documents in both print and Web-based formats. The division develops curriculum for the province's K-12 education system. The end product of the curriculum development process is usually a document which defines or supports curriculum. Document production, then, is a major function of the division.

Utilization of these alternative formats necessitates a Web presence by the division. A new Web Site for the division is under development; designed with users in mind and the types of information they will likely be seeking. A slow and steady approach has been taken; one which permits reflection, an examination of

the multitude of issues accompanying such a move, and time to permit a proper design process to run its course.

Change in organizational practice frequently requires adjustments to the organization's accepted protocols. In recognition that protocol change affects day-to-day work practice, a pilot process has been undertaken to achieve some level of understanding of the implications such a change will have for the division. The pilot, focused on a single existing document (A Primary/Elementary Handbook), is immersed in two major areas, the document production process and document design.

Document production is inclusive of the conceptual modelling and the practical stewarding of a document through the production phase until the end product has been created. Document design, though inextricably linked to document production, focuses on document logic, format and the infrastructure behind the final product that a user may access.

DOCUMENT PRODUCTION PROCESS

The curriculum development

process has a set of procedural protocols which defines it. Document building through the use of communication technologies changes the way things have been done traditionally. A Web-based document challenges the historical protocols of print. Containment between two covers is no longer possible since this new format relies upon files of information distributed in a more democratic fashion; files which do not have to reside in the same location or even be discrete to any particular document.

This distributed model opens up the process to greater collaboration in production and design. It necessitates increased collaboration among curriculum developers and promotes a team approach to the process. As a result, we can expect to see some breakdown of ownership of content in discreet disciplines. In fact, content tends to assume communal ownership. As open access to information increases, cross-discipline management of communal digital information becomes part of the development process. Portions of documents from a variety of internal sources may have application in other domains.

Consideration must be given to

deciding and creating for multiple users. Traditional print format curriculum documents were available primarily to educators and even then only to those educators whose responsibilities necessitated access to them. Web-based documents can be accessed by any educator, parent, student or member of the public.

Empathetic planning must take place which anticipates the needs and interests of such users. Throughout the process it is also necessary to remember that it is a single individual who will browse the document.

Questions of intellectual property, citations and copyright are more pronounced in this document format due to the ease by which linkages may be created to many sources of information. The Department of Education assumes intellectual property rights over documents created by its employees. When a document incorporates links to content created by others outside the Department, this notion is challenged. How far afield should one venture in securing information? Should links be limited to other education documents where an understanding has been reached regarding mutual usage? How much responsibility does a government department assume for content added to a linked site after the initial linkage has been created? The answers to questions such as these are important to the initial planning process.

DOCUMENT DESIGN

Conceptual modelling is also integral to the design process. A document's logic, that is, the coherence and structure given to the document as a communication structure, demands intensive examination if it is to achieve its maximum impact. One must get one's mind around how headings/sub headings, primary links/secondary links, and other such organizational devices are used to cre-

ate the document.

Format structure exists within this logic and dictates how content will be systematically organized. This layer of a document deals with the look and presentation of information. It sits atop the content logic as a means of providing continuity and structure to content.

Content logic refers to how information is assembled to create meaning to users. It results from decisions about types of content, how they relate to each other; from decisions about simplicity and depth hollowness; from the way content needs to flow to multiple users and how content needs to be sequenced to communicate its messages.

File structure, indexing of information, file size and file access are important considerations to document design and document functionality. An understanding of file hierarchies, the value of storing information in discreet and relatively small files and, knowing where to find digitally stored information necessary to document construction are a part of a basic skill set.

Planning of navigational pathways must recognize the intuitive logic a user brings to this type of document. It must also recognize that interactivity in a document is a two-way street. There must be opportunity for users to react, respond and contribute to documents which support teaching and learning. This capacity extends the potential richness of a Web-based format.

A document's content logic must ensure that information is easy to find and reflect potential interests of the expected users. Provision must also be made for users who wish to go beyond basic information. This may entail building secondary levels of content or arranging linkages to information existing at other sources.

Relationships among content and the

flow of that content must be considered in advance of building the document.

Web-based documents dictate a different conceptual modelling process from print documents. Creators must think holistically about content logic while seeing behind the content to the documents internal structural logic using information drawn from a totally decentralized resource base. It is impossible to create such a document in the traditional linear flow of print-based documents.

The pilot process which the Division of Program Development is currently engaged in will provide some of the answers raised here and will likely raise many more as the organization comes to grips with a revolutionary approach to carrying out its primary mandate. It means rethinking how it does business. Ω

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Communications Technology within the Technology Education Program

by
Dennis B. Sharpe
and
Leon Cooper

Communications technology is an important and far-reaching component of education and work. It has changed the meaning of literacy and the range of capabilities that are required to be an effective citizen. Literacy now has a technological component. Communications technology not only affects what we need to know, but how we come to know it. Information, the basic raw material that we use to construct individual and collective knowledge, is growing exponentially. The communications technologies that enable us to house, distribute, and manipulate that information is evolving even more rapidly. What was once a collection of discrete tools, systems and content has now converged into one worldwide inter-connected network of computer-mediated systems in which all forms of information are digital. Being digital, such information is interchangeable, both across media and in the ways it can be used.

Computers, which are at the heart of most communications technologies, are incorporated in, embed-

ded in, and employed by almost every other form of technological system. They are used to sense, control, manage, and manipulate everything from kitchen stoves to traffic lights, from telephones to space flight, from doing homework assignments to manufacturing jumbo jets. In our society, literacy must include the language, terminology, and impact of the technology—capability goes beyond literacy and must include the ability to solve problems in, and with, the technology.

K-12 EDUCATIONAL RESPONSE

The K-12 education system has responded to these needs in two primary ways. One thrust has been to integrate communications technology into all areas of the curriculum at all grade levels. Students develop technical skills and competencies by using the tools in everyday activities. A second thrust has been to develop a program of studies in technology education. Through this program, students are expected to develop a deeper knowledge, more comprehensive

skills, and significantly greater capability in the area of technological problem solving and skill development. Part of that broader understanding includes technology, not just as product and tool, but as a problem solving process. The latter use has significant potential to provide breadth and depth within the school curriculum.

The technology education program in this province has the five strands of communications, control, production, energy and power, and biotechnology (see <http://www.stemnet.nf.ca/DeptEd/Program/teched/framework/index.html>). In addition to being a primary focus, communications is also a significant component of the other four strands. All are implemented with a design and problem solving methodology. This is consistent with programs in other jurisdictions in Canada, e.g., British Columbia (see <http://www.est.gov.bc.ca/curriculum/curric/irp.html>), the United Kingdom (see <http://www.ccea.org.uk/pdf>), Australia, and the emerging technology program proposed for the United States by the International Technology Education Association through the Technology for All Americans Project (see <http://www.iteawww.org/taa.html>).

K-12 TECHNOLOGY EDUCATION— COMMUNICATIONS TECHNOLOGY COMPONENT

The high school component of the technology program has two communications technology courses, Communications Technology 2104 and Communications Technology 3104. Technologies within these range from animation and Web publishing to control systems. Problem scenarios utilized in the courses range from very simple to very complex. All students are expected to develop new,

original solutions to a number of open-ended real life problems. Enrollment has grown steadily since the courses were implemented several years ago. Currently there are 1593 students in 66 schools enrolled in Communications 2104; and 910 students in 41 schools doing Communications 3104. For the first three years, HRDA funding was used

HRDA funding, is relatively new and is being piloted this school year.

Hands-on student activities are the heart of technology education. Communications problems are based on real life situations and may come from any area of human interest or endeavor. Students, acting in design teams, select a problem and develop a communications technology solution. As part of the process they develop a design brief, research the problem, identify a range of possible solutions, select the best option and develop the solution. They test and evaluate their product. This process ensures development of technical skills and technological capability. One student group at South-West Arm Academy, for example, works through a series of real life design problems associated with effective communication systems, a fishing boat, home security, advertising a local business, and automated equipment control.

TEACHER PREPARATION

Teacher development with respect to technology education in general, and communications technology more specifically, is currently accomplished through a combination of professional development workshops organized by Department of Education, and through a specifically developed diploma program housed in the Faculty of Education at Memorial University. The latter program consists of 10 courses, seven of which are laboratory courses that address competence and skills in specific technologies. Two other courses provide an in depth review of the background, philosophy and development of technology education; course organization and structure; curriculum development and application; and technology education laboratory design and management. The tenth course is in student teaching. Nine of the courses are offered over three summer sessions.

Hands-on student activities are the heart of technology education. Communications problems are based on real life situations and may come from any area of human interest or endeavor.

to supply learning resources to schools. Communications technology also plays a significant role in the province's two design courses, in Computer Technology 3200, and in a new course, Integrated Systems 1205, currently being piloted.

At the Intermediate school level, the technology education program contains a module in each of the five core strands listed earlier. The grade seven Communications Module, also developed with the assistance of

The initial laboratory courses develop basic skills and competence in design and problem solving, working with materials, electronic and graphic communications, networks, CAD, control systems, and power sources. Progressively more complex skills are developed in each of the technological areas, through successive laboratory courses, that include advanced design work, integrated technologies, fluidics, manufacturing and production, robotics, and CNC operation. In the field of communications technology in particular, the teacher preparation curriculum is designed to develop a broad range of skills and competencies pertinent to the delivery of the provincial K-12 Technology Education courses and modules. The majority of the laboratory courses are delivered in a new model facility, housed within the Faculty of Education, that was specifically designed for this diploma program (see details at <http://www.stemnet.nf.ca/Community/Prospects/v3n1/index.htm>). The facility was equipped primarily through funding from the HRD Agreement.

With respect to inservice professional development, the Department of Education organized and delivered technology related workshops and seminars for teachers during the summer of 1997 in novice level communications technology (primarily Web-based) and in advanced technology (primarily programming and control). Similar sessions are planned for the summer of 1998. In addition, many school districts offer sessions to assist with the upgrading of teacher competencies in this and other technological areas.

CHALLENGES TO IMPLEMENTATION

Challenges come in many forms, and most are driven by rapid technological change. Access to technology

is often cited as a problem. Many people, for example, feel that communications technology courses require the latest hardware and software. There are, however, specific technology resource requirements for each course. All technology courses employ design processes and student design teams and function best in a technology lab. Technology labs are different than computer labs in that fewer computers are required, but other technologies and equipment are also needed. Some of the computers that are utilized need to be relatively powerful to effectively deal with some of the graphic communications applications; and networking and Internet access are important. Many of the software tools needed, however, are inexpensive.

Teacher preparedness is also often cited as a problem. Many classroom teachers have not encountered communications tools before, or have had no experience with design and problem solving processes. As a result, they may feel reluctant to teach courses in communications technology. Among educators in general, the lack of knowledge about technology education (and communications technology in particular) has been a problem. It should be noted, however, that this situation is easing somewhat, but is related to a similar issue—not differentiating between technology integration and technology education. In this instance, the use and application of design and problem solving processes as a key feature of technology education may not be recognized.

CONCLUSION

Efforts are underway on a number of fronts to ensure that students are exposed to a range of communications technologies to help them develop literacy and competency in these areas. Resources have been, and will continue to be, a major determi-

nant for success along with an understanding of technology education in general. Teacher preparation efforts have been well received, and teachers have adapted well to the new program and courses. Despite the challenges, there has been significant success in this province in the area of technology education and in communications technology in particular. Student interest in the courses continues to grow. Ω

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The Technology Education Centre

The Technology Education Centre (TEC) is a project of Corner Brook/Deer Lake/St. Barbe School District, College of the North Atlantic (CONA), Sir Wilfred Grenfell College and the Canada/Newfoundland COOPERATION Agreement on Human Resource Development. The centre is located in G.A. Mercer Junior High School in Corner Brook and provides training and instruction to K to 12 and post secondary faculty, instructors and academic support staff in the educational use of computers and in the application of information technology to educational settings. It provides opportunities for research and development in educational computing as well as opportunities for activities such as courseware development and LAN manager training. Training is conducted through on-site sessions and via distance education technologies.

The facility consists of two large computerized training laboratories, two multimedia workrooms and a conference room. It is equipped with thirty computers and two servers. Bruce King, the director of the centre, oversees the day-to-day operations including scheduling and conducting training sessions, as well as software and hardware maintenance and upgrading. A management com-

mittee and a board of directors comprised of representatives from each of the partners administer the project.

The integration of information technology into educational settings is a new and controversial process. Available research has not offered clear direction in this process. One purpose of the TEC is to provide teachers in this province an opportunity to investigate issues concerning technology and how it should be used in education. The centre endeavours to provide:

- leadership and consultation in the area of integration of computer technology into instruction and curriculum
- evaluation of software to determine its applicability to the curriculum and its appropriateness for particular learning levels
- opportunities to develop instructional aids utilizing software, tutorials and multimedia presentations
- opportunities for educators to explore and plan for cross-curricular introduction of computer technology
- a means whereby researchers (research fellows, graduate students) can develop instructional technology using high-end computer software and hardware

The TEC has had a great deal of use since it opened during the summer of 1997 and King is pleased with the results. "Integrating technology into the curriculum is an important process," he says, "and professional development for educators in the area of information technology is a significant first step." Providing these professional development activities makes up a substantial part of the centre's mandate. King and members of the management committee collaborate with educational institutions to identify priorities with respect to technology training needs and then develop training programs to address these needs. "Technology is a moving target," says King. "We constantly have to assess current developments in the field to ensure that educators maintain their level of knowledge. This can be done only by helping them keep up by providing reliable and current information, and training sessions."

The TEC has offered a host of institutes, conferences and other professional development activities to a variety of clients. An impressive list of institutes is scheduled for the summer of 1998. In July the centre will provide a Novice Technology Institute for teachers who have little or no experience with technology and its use in the classroom environment. The institute will deal with topics that include an introduction to Windows 95/NT, using the World-Wide-Web in the classroom, email using Eudora Lite, creating a personal home page, creating an electronic resource-based learning unit using HTML, and putting pages online. Topics of other institutes include developing school intranets, Windows NT administration, using technology in the intermediate grades, using technology in the primary/elementary grades, and using CSL Win School for Administration and data manage-



Members of the Management Committee of the TEC: (left to right) Don Downer, Keith Payne, Ed Andrews and Bruce King (missing from photo: Peter Gullage, Richard Parsons, David Quick and Randy Rowsell)

ment.

The expertise brought to this project by the three educational partners is also utilized in promoting a collaborative environment for dynamic research and development. The centre sponsors initiatives such as:

- a review of the effectiveness of current pedagogy in the area of technology transfer and its integration through action research
- the use of innovative experimental approaches in the educational use of computers
- the development of instructional aids involving the creation and innovative use of multimedia tools
- the development of effective course programs to provide useful computer skills training to adults
- the trial use of experimental software programs using advanced instructional technology (hardware and software) and the dissemination of the results of such experiments to users

Another important mandate of the TEC is to provide educators access to current and relevant infor-

mation. The centre's home page provides access to shareware and educational resources. Connectix hardware and software, and Microsoft Netmeeting are also available to allow the TEC to function as an electronic messaging and conferencing centre. However, access speeds often hinder the ability of schools to effectively link to the Internet. To address this need, King and the centre's management committee are working to develop Intranets in schools in their district.

An Intranet is like a private Internet existing and operating on a school, district, or company internal computer network. The function and speed of the Intranet is not dependent on the connection to the Internet. Intranet technology offers an emergent tool set that will enhance and foster collaboration, engage learners with a relevant and media-rich presentation, and provide teachers with curriculum resources that are immediately accessible. Intranets offer the ability to teach students Internet skills without an Internet connection. Lesson plans, media, email, resources for classroom

presentation, and primary and secondary research documents are only a click of a mouse away. The resources can be arranged for a single project, a class, a department, a school or for district-wide application. Teachers and students can assist in the design and implementation of much of the information. The TEC will offer an institute this summer to educators interested in developing an Intranet in their school. When the school Intranets are in place, King hopes to connect the Intranets to produce a district-wide Intranet.

The development of the TEC has provided significant benefit to educators in the western region of the province. The faculty of educational institutions at all levels of the system have access to a facility where they can get current and relevant information on education, and training to upgrade their information technology skills. "The spirit of cooperation that is a characteristic of this project," says King, "will continue to produce benefits as the relationships and this project mature." Ω

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The Open Learning and Information Network

by
Genevieve Gallant

The Open Learning and Information Network (OLIN), with the dynamic provincial network of content and service providers, continued to provide greater access to learning opportunities and resources throughout the province in 1997-1998. Many initiatives took place with the assistance of the Canada-Newfoundland Economic Renewal Agreement.

PROFESSIONAL DEVELOPMENT WORKSHOPS

Distance education and training programs are moving towards a more open and flexible format as new media provide alternative delivery modes. New media developments are enhancing learning with promises of access, interactivity, ease of use, and furthering the concept of lifelong learning. This shift in delivery mechanisms to enhance learning creates many questions for educators. How do faculty members get started? What does a good distance learning course contain? What instructional designs should be used with the new media to provide effective learning? OLIN, in collaboration with its partners, attempted to address these questions through a series of professional devel-

opment workshops for distance education teams.

During the 1997-98 academic year, five workshops were delivered for faculty, instructional and Web designers, and technical specialists in the public and private sectors. In St. John's, in October 1997, Instructional Design and Multimedia Production Technologies for Teaching at a Distance or in a Classroom was delivered by Dr. Richard Schwier and Dr. Earl Misanchuk from the University of Saskatchewan. Participants explored multimedia tools and techniques, instructional design issues, and visual design principles for instructional multimedia.

In November 1997 at the Technology Education Centre in Corner Brook, Dr. Terry Anderson from the University of Alberta provided an overview of network learning features to include in Web-based courses and instructional designs guidelines in Teaching and Learning on the Nets workshop.

Before My Hands Hit the Keyboard: Planning and Facilitating Learning Using the New Media was presented in Corner Brook and St. John's in February 1998. Dr. Margaret Haughey, Professor in the Faculty of

Education at the University of Alberta, demonstrated the importance of planning for learning, what elements to include in the planning process, and facilitation techniques with the new media.

Computer conferencing systems play an important role in program delivery. With so many conferencing systems software available, the Evaluation Criteria for Web Conferences workshop provided a process for faculty to evaluate these systems that will meet specific local needs. Dr. Bruce Landon from British Columbia who worked with the Standing Committee on Educational Technology in British Columbia led the workshop in Corner Brook and St. John's in March 1998.

The final workshop was a collaborative effort with the Centre for Academic and Media Services in the School of Continuing Studies of Memorial University. Designing and Enhancing Instruction: A Summer Institute was a week long institute that took place at Memorial University in May 1998. The summer institute consisted of a series of hands-on mini workshops and a core workshop. The mini workshops provided an opportunity to learn about

and use specific tools and techniques to enhance courses. These included HTML Basics, Introduction to PowerPoint, Introduction to Visual Design Principles, Teaching portfolios, Assessing learning, Facilitating Online Learning, and The Library, the Internet and course preparation. Presenters for these mini workshops were from Memorial University and the College of the North Atlantic.

Dr. Liz Burge of the University of New Brunswick delivered the core workshop. Dr. Burge, who has delivered workshops for OLIN in the past, brought participants through the instructional design process and how a faculty's role has changed with the delivery of online courses.

COLLABORATIVE PROJECTS

A second area of focus for OLIN is partnerships in the development of open and distance learning. The Joint University/Provincial College Business Course in Organizational Behaviour was a partnership involving Memorial University's Faculty of Business, CONA's Business Faculty at Clarenville campus, Memorial University's Centre for Academic and Media Services, librarians and technicians at participating college sites, and the Canada/Newfoundland COOPERATION Agreement on Human Resource Development. The course, Organizational Behaviour, is found in both institutions and a transfer of credit exists between the institutions. The first offering took place in the winter semester of 1997 for college and university students. A formative evaluation of this offering led to modifications and enhancements for the second offering in the fall semester of 1997. This course continues to be delivered through the Web at both institutions.

The College of the North Atlantic, Clarenville campus, the Office of Learning Technologies and

OLIN formed a partnership to redesign the Telework Program to a more interactive model using enhanced Web-based features. This project will include the development of effective instructional designs for courses in the Telework program and provide a research component that will define and develop an application layer suitable for college students and for delivery in rural areas with limited bandwidth.

The Department of Education and OLIN collaborated on the Web-based delivery of a French module, French 2101 Unité: Le monde Autour de Nous for high school Level I students. The project is in the implementation stage and will be completed in the academic year. The participating schools are located in the communities of Lumsden, Westport, Middle Arm and Gander. A Web designer in the Virtual Design Centre assisted with the Web design.

LEARNING NETWORK PLANNING GROUP

A number of agencies delivering programs and services to individuals and groups in communities throughout the province are collaborating to use their collective resources more effectively to enhance program and service delivery. This model pilot network allows participants to share bandwidth and community locations and to test technologies and procedures that will be implemented in a full provincial offering. Agencies in this collaborative effort are: the School of Continuing Education, Memorial University; Telemedicine/TETRA; STEM~Net; the College of the North Atlantic; and the Department of Education.

INTERNATIONAL MARKETING

OLIN has also focused on national and international partnerships for the development of open and dis-

tance learning resources. Newfoundland and Labrador has a long and successful history of distance education delivery. With international markets and financial institutions recognizing the importance of distance education, OLIN and the service and content provider partners are exploring the opportunities to capitalize on emerging distance education market opportunities. An international marketing study for distance education programs was performed for OLIN. Programs in Business and Health studies, Telework, and Bachelor of Technology are near readiness for international markets.

OLIN and its partners have undertaken several initiatives this year. OLIN will continue to work towards meeting its primary focus, that of providing greater access to learning opportunities through collaborations and partnerships with groups and individuals who are committed to an equitable distribution of resources in the province. Ω

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Designing Courseware for the Web:

Flash vs. Function

by
Brian Kerr
and
Allyson Hajek

As student populations grow, it is increasingly likely that learner needs will not be met by a static, production-oriented system of instruction (Butler, 1997). Some suggest that new technologies could provide the solution. Anyone attempting to use the World-Wide-Web (WWW) for instruction for the first time is faced with the challenge of choosing the forms of media to incorporate into the new multimedia learning environment. For example, what components of a course should go online? Should this online component include text, audio, video, dynamic script, or animation? Just because it can be done, it looks impressive or fits well, does not mean it should be done. As with traditional teaching, those who develop media or instructional aids for use on the Web should consider the various learning styles of the students and the appropriateness of the chosen medium. They should not get too caught up in the technology. High resolution imagery and animation may look quite impressive in a demonstration, but before you take the time and energy to integrate such features into

a course, consider whether they truly are going to assist in conveying the intended message.

SPINNING A WEB: PEDAGOGICAL ISSUES

The WWW should not be used simply as an information container for instructional content. However, online courseware should not be viewed as being in direct competition with other more appealing online resources. The foundation has to be a pre-determined structure involving presentation, practice, and guidance. According to Creed and Plank (1998), "good Web site design begins with good pedagogy". Duchastel and Turcotte (1996) argue that instructional design and teaching in an information-rich environment should be carried out differently than in traditional instructional environments. They predict that a new theory of applied learning will emerge to characterize the evolving learning process for this environment.

The purpose of creating an online learning environment is to enhance student learning. This environment has the potential to provide instruc-



tors with an opportunity for structuring learner interaction with the material in ways not possible previously (Creed and Plank, 1998), especially outside the conventional classroom environment. Designers must focus on the appropriate use for delivery of learning material by considering the content, learning objectives, motivation, and learning styles. The emphasis should be placed on giving learners the appropriate learning and thinking tools. Thus, with guidance, learners will find out what they need to know independently and will continue to use these skills after the course is over. Too often, when courseware designers gain rudimentary knowledge of HTML, they forget about principles of good pedagogy and design. As a result, course Web components tend not to meet their needs nor those of the learner (Creed and Plank, 1998).

DESIGN

The Web component of a course should be designed with interesting and appropriate graphics and without distracting glitter (Boshier et al., 1997). "Students will be only temporarily impressed by flash and dazzle. Long-term impact depends on substance. Good content is ultimately more interesting than lots of spinning logos" (Creed and Plank, 1998). The designer should make decisions as to how the glitter and smart animation might detract from or enhance the objectives of the course. Consider the typical learner and create a standard in terms of minimal technical specifications (i.e., screen resolution, amount of memory, and other such hardware and software issues). The design goal is to encourage intellectual interaction with the content, not simply provide lots of 'click' areas. Students who are seeking information online want to find a particular Web site easily, navigate through and obtain the desired infor-

mation, leave the site and return to it with ease if necessary.

Placing courseware online does not require using all the latest 'bells and whistles'. While a course Web site should not consist of the text only, the point is to take advantage of the capabilities of the Web without overdoing it. Having course material online does not ensure instructional effectiveness. Designers should use only graphical elements, animation, audio, and video that significantly enrich the program. Neilson (1998) recommends avoiding gratuitous use of what he calls "bleeding edge technology". For example, highly complicated graphics and three-dimensional designs should only be used if the content dictates. Scrolling text, marques, and constantly running animations should also be avoided because these become significant distractions.

ISSUES

Online courseware has to be interpreted by many browsers running on numerous types of computers with one of a variety of operating systems. Therefore, when considering flash, designers should realize that students learning online cannot be expected to use any one kind of hardware or software. When designing courseware for online use, the language of the Web has to be oriented towards structure, not layout. Designers cannot specifically dictate what a document will look like in terms of layout because there is too much variation across platforms (Maddux and Johnson, 1997). In addition, depending on computer literacy, the user can take control of the way a Web page looks on the screen by changing their own browser preferences. Furthermore, there are technical issues such as bandwidth limitations, modem speeds, and accessibility that may restrict instructional methodologies. For example, limited speed and band-

width will obviously mean slower performance for sound, video, and intensive graphics.

NAVIGATION

Web sites need to have frequent and consistent navigational tools for the learner. As Creed and Plank (1998) stated, these are the little road signs that help a learner get from here to there and back again.

Navigation options should be located at the top and/or bottom of every page depending on page length, and can be text-based, or use inline images that look like buttons. Inline graphics are easy to use and misuse, and are most effective when used sparingly. Designers should choose a handful of symbols and words as navigational aids and use them cautiously and consistently (Tilton et al., 1996). To make it easier to decode the symbols, include the 'redundant' text labels.

Although a formal navigation bar is not essential, it is a more organized approach to Web site design than navigational links that are embedded directly in the text. Some might argue that either will suffice, but links embedded directly in the text can have adverse effects by interrupting the reader's flow. Therefore, it is better to provide linking options either before or after the main body of text to ensure that the flow of information is not interrupted and that the main point is conveyed.

TEXT

Reading from a computer screen tends to take about 25% longer than reading from paper (Nielsen, 1998). According to Nielsen (1998) and many usability studies, individuals tend to scan a Web page rather than read the entire page. Therefore, it is beneficial to keep the text concise. "Like the fold in a newspaper, the bottom edge of the screen will stop

some people from reading further" (Levine, 1996). Scrolling decreases attention.

Users on slow links may get impatient waiting for documents which have dozens of screens of text to load and will move on. A solution is to divide the content into pieces that do fit on single screens. Be aware that when the user has to follow a link there is an interruption as the new page is loaded. If these interruptions come too frequently the flow of the text suffers and the reader is distracted. Thus, it is important that pages be neither too long nor too short. A good rule is to make a page at least as long as a screen, but limited to two screens.

GRAPHICS

Although images have the power to add to the attractiveness and to the educational value of Web pages, they can be overdone. The real estate on a Web page is precious. Pages should not be cluttered with unnecessary clip art, icons, dividers, borders, and other decorations. Graphics should be used sparingly because each image adds to the time the browser requires to load the document, and depending on the amount of colour chosen for each image, the result could be a mixed quality. Images are better used for establishing common identity among Web pages, or when content dictates this type of enrichment. Images are also suitable for adding a touch of emphasis. Again, designers should try to conform to a standard.

AUDIO/VIDEO/ANIMATION

Audio, video, and animation are often used to convey a message or enhance a learning experience. The problems occur with its integration and associated technical matters.

Movement attracts the eye and has the potential of captivating the

viewer's full attention. The power of the moving image can be advantageous if incorporated appropriately. It is important to avoid arbitrary motion or motion that detracts from the content of the Web page. The content of the animation or video should support the intent or concept.

Effective integration means that the audio should contribute to the other media on a Web page by explaining a graphic or providing an example of something described in text. It should not be a way of restating the message which has already been conveyed by the text or a graphic.

Once the audio or video is in digital form and integrated into the content on the Web page, technical issues come into play. One option for distributing audio and video over the Internet is to have users download the sound clip and play it from their hard drives. The length, file size, and speed of the connection combine to determine the download time (that is, the time the user must wait before actually hearing the audio). For example, one second of CD-quality audio (44KHz, 16-bit stereo) can take about 49 seconds (using a 28.8Kbps modem). Reducing quality can reduce the download time but it is still a factor. The appeal of immediate gratification can easily be lost and the quality of the audio or video file may not be worthwhile.

Another alternative is to stream audio/video, or to play sound or video files in real time on request. In theory this might seem more effective, but quality appears to be dependent upon Internet traffic which can lead to serious buffering delays. The idea is to provide immediate feedback without first having to download the associated file to a hard drive; however, audio and video files must be compressed by a factor of 50 to 100 before being efficiently streamed via the Web. This

compression will degrade the quality somewhat (Estrella, 1997).

Furthermore, the end user does require a software "plug-in" or player to take advantage of the streaming audio or video file. Finally, obtaining and installing this specific software requires additional computer literacy on the part of the learner and designers cannot easily make such assumptions.

DYNAMIC SCRIPT

The use of dynamic script includes running simulations, performing demonstrations, modelling exercises and some form of learner assessment. For example, scripted programs can be delivered through a Web site providing 3-D modelling and/or graphic animations with an interactive feature. Online drill or practice testing can be used to reinforce material, even if the results are not used for student grading. Reading comprehension questions in short answer or multiple choice formats can provide students with an immediate assessment of their level of understanding. This is a tremendous advantage over assessment tools of the past. A student does not have to wait for an assignment to be graded because the marking is completed online. Instructors benefit as well. They avoid routine grading and can spend extra time interacting with students. In addition, they can be provided with student results using an online script and can readily identify content areas in which some students may be having difficulty. Then the instructor can provide remediation, assistance, or perhaps an online tutorial.

One disadvantage is that dynamic script can be rather impersonal from a learner's perspective. Secondly, a great deal of time and skill may be required to develop such scripts. For optimal benefit, dynamic script features have

to be easy to use and distinct outcomes should match the instructional objectives.

COMMUNICATION TOOLS

By its very nature, the online WWW environment should encourage interaction. Students can interact with the course content, or they can interact among themselves, with the course instructor, and with individuals who may not be involved in the course (Boshier et al., 1997). The Internet provides a variety of methods to facilitate this interaction through asynchronous tools such as point-to-point email, listserves, newsgroups, bulletin boards, and computer conferencing, or synchronous tools such as chats and real-time video/audio conferencing. However, sustained Web interaction can be mentally demand-

ing. Designers should realize that creating convoluted constructivist and collaborative learning tasks may not always be the best way to assist learners. For example, some communication tools require a high level of skill and computer literacy on the part of the learner. As a result, technical difficulty or learning the technology could upstage learning the content.

SUMMARY

Some benefits of developing and delivering courseware for the WWW include:

- The convenience and cost of publishing information in this environment. Unlike printed resources, once materials have been posted to the WWW, information is easily updated and disseminated.

• WWW browsers are moving towards integrating access to all types of Internet resources via one easy-to-use interface. Instructors and students can quickly and easily learn to use this all-inclusive software to navigate the Web, access course materials, post information and communicate with others.

- The Internet is readily accessible to anyone with a PC, a modem, and an Internet service provider.

The Internet is not a solution for poor teaching. A course Web site should incorporate human-computer interface design principles and not simply transfer paper or previous non-graphical interfaces to the screen.

(continued DESIGN on page 32)

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The Research Internship

a new approach to internship programming

When Lindy Rideout, the program facilitator, and Lloyd Burt, co-author of the program proposal, first considered an internship program for students at G. Shaw Collegiate they faced significant challenges. They found that it is difficult to establish a traditional program in their community where work is seasonal and business is limited. They also found, however, that local industry is working to diversify and that a shift is occurring in resource-based industry. Traditional industries are investigating new approaches to their processes and attempting to develop new products, and new industries are working diligently to get a foothold in the marketplace. Information drives these endeavours. With this in mind, Rideout and Burt established an internship program based on a research and development model. The project is sponsored by Human Resources Development Canada under the Youth Internship Canada Program.

The program is designed as a true partnership, one in which both the students and business partners receive tangible results. Businesses in the New World Island area of the province have access to a mechanism for investigating new ideas and when the students graduate, they will meet businesses' demand for highly trained employees. Students are provided with a unique blend of typical on-the-job training, and research and development experiences. The program consists of high school credit courses that combine classroom instruction with practical field placements. The students receive high calibre training in various industries using state-of-the-art technology and procedures, and the employer receives valuable information.

The research internship program is open to Level III students at G. Shaw Collegiate. It is designed for students who are interested in careers in new and emerging sectors within resource-based industries. Students

often select the program to explore their own career possibilities. Others see it as an opportunity to enrich their school curriculum or specialize in sciences. As a result of the internship placements, many students will move directly into the workforce while others pursue their interests further with post secondary studies.

The program is open to employers whose business utilizes natural resources and could benefit from research and development activities. Students may be placed in a number of occupational training positions within a variety of new career fields that include aquaculture, secondary processing of natural resources, botany and various applications of information technology to resource-based industry.

Once a work placement has been finalized, the youth internship coordinator and the employer, in consultation with the student, will develop an individualized research plan. This plan outlines the activities in which



the student will be involved while working with the employer.

Each student's job description is flexible. The work varies and includes regular job-specific tasks assigned by the employer. The work is highly technical in nature. In addition, work in the field is complemented by the investigation of new ideas at the Research and Development Training Centre located at the school.

Through these experiences, the focus of the program is to provide students with an opportunity to:

- relate skills and knowledge learned in school with hands-on experience in the workplace
- explore career options and plan their future education
- understand the world of work and learn from experts in various fields
- build self-confidence, and develop leadership and social skills
- identify new and emerging industries in their area and help these industries grow

The students regularly corresponded with noted experts throughout the world, via email and telephone, to share their results and ask advice. The responses from these researchers, many of whom work with universities and other public sector agencies, have been quite positive. "It's been wonderful to watch the students develop their interpersonal skills as they communicate with these experts," says Rideout. "This interaction is an important part of the process in research. The students were tentative at first but have learned to relate to these individuals and share what they have found."

Although the program is designed to give students experience in the workplace and provide valuable information to local businesses, employers also pass on their expertise to students using more direct teaching



Research intern Jeff Rogers works with a local aquaculture company to test a new method of harvesting mussels through the ice.

methods as well. In the Research and Development Training Centre employers will teach the various technologies and processes used in their industry to the students under laboratory conditions. In February 1998 the interns also toured a number of research facilities in the province. These included tours of the Science, Chemistry and Physics, Engineering, and Geology buildings, and the Queen Elizabeth II Library on the St. John's campus of Memorial University. The students also saw the facilities at the Freshwater Fluvarium in Pippy Park and toured the oil refinery in Come-By-Chance. "This was an intense learning experience," says Rideout of the two-day field trip, "that demonstrated that there are a lot of exciting, advanced things happening in this province."

Rideout began with high expectations of the students and he has not been disappointed. "The students have provided valuable research to employers in their area and their efforts are producing tangible results,"

says Rideout. The students work on the research internship four days out of the 14 day cycle but every student has access to the facility on a regular basis and can work on their projects whenever they have time. The atmosphere in the research and development centre is office like and professional.

In the 1997/98 school year, students worked on fifteen projects through the Research and Development Training Centre in a number of resource-based industries. Through one of these projects the students are conducting experiments with the Cottles Island Lumber Company and Breakwater Fisheries' crab processing plant. The lumber operation discards large quantities of bark and the crab processing plant has to deal with large quantities of crab shells. The students are conducting a long-term experiment to study the decomposition cycle of the bark and shells so they can determine the optimum time to mix the substances to create a super-rich soil. Other stu-



Working in the Research and Development Training Centre at G. Shaw Collegiate gives the interns a clear indication of the importance of technology to modern business.

dents are working with the same lumber company to find uses for the mill's byproducts of bark, wood shavings and sawdust. One possibility they are exploring is the production of fire logs. Other students are conducting trials and experiments for companies working in aquaculture. For Farewell Mussel Farms students are doing larva identification, weight analysis of mussels, water quality surveys and tidal pattern analysis. In cooperation with Memorial University's Ocean Science Centre, students are studying how to grow fish in salt ponds. They perform experiments to keep track of water temperatures and growth rates of the fish, and are experimenting with methods of controlling the fish with sound. They are also conducting salinity and water quality tests at potential aquaculture sites around New World Island. Other students have conducted and mapped promising geological studies of the area for G.O. Tectonics, a geological surveying company.

The students' work helped the Cottles Island Lumber Company/HIGHLAND HOMES LIMITED

secure an \$82 million project in partnership with Argomanzun Limitada of Temuco, Chile. These companies have agreed to proceed with the development of Primavera, a 1000-home satellite community located outside of Temuco. Highland Homes will provide Canadian crafted homes for this housing development and assist in the financing and administration of the project. One of the students in the research internship was instrumental in developing a Web site that advertised the company on the World-Wide-Web. The Web site was translated into Spanish for the Chilean market. The students also performed research into climatic implications of housing in Chile, traditional and modern architectural styles and cultural preferences of the target market. This information proved helpful in developing a feasible and attractive presentation to interested parties in Chile.

Burt is excited about the success of the program. "Our students are getting some very valuable experience in this program," says Burt. Rideout shares this enthusiasm and believes

that it is an example of a true partnership between his school and local business. "It's a great example of how businesses and schools can support each other in a meaningful way," say Rideout. "Businesses are getting some important work done and our students have a real sense of accomplishment as they work on real problems with state-of-the-art technology." Ω

(The Research Internship Program has been recognized by the Conference Board of Canada as one of the 100 best business/education partnerships in the country. Details of the program are published in the 1998 IdeaBook.)

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Inexpensive High Performance Computing

by
Tony Kocurko

It is possible and, in fact, not very difficult to attain high performance, parallel computing using collections of personal computers. Parallel computing is a process where multiple computers work concurrently on different parts of the data in a problem or on different sub-problems, possibly exchanging data with each other intermittently or otherwise coordinating their actions. The easy part of this scheme is constructing the parallel computer from the "farm" of PCs and the associated software. The PCs may be connected through an internal network or via the Internet. The difficult part is writing the application programs. The Department of Earth Sciences is convinced of the feasibility of this approach on a real-world problem in geophysics by realizing an eight-fold speed increase on 11 CPUs over the usual one CPU and an improvement by a factor of three over the university's high performance computer.

Besides the requirement of a set of personal computers, the only other necessary hardware includes a network interface card for each computer, a network data switch, network cabling to connect the personal computers to the switch, and a monitor, keyboard and mouse for one of the PCs to act as a system console. As

other PCs become available, possibly cast offs from employees who have upgraded their own, they can be incorporated easily into the existing hardware of the farm.

On the software side, the operating systems can be a mix of Windows 95, Windows NT or Linux, which is freely available and of commercial quality. For the systems using the Microsoft operating systems, a commercial product is required in order to allow programs to be initiated on one PC remotely from another PC. In order to write the applications, one of the programming languages 'C' or FORTRAN, must be installed on at least one of the computers. Finally, the program that allows the different parts of the user application to coordinate their activities and to share information, and thus to form a single, parallel virtual machine (PVM), must be present.

The process was developed at the Oak Ridge National Laboratories in Tennessee. Note that by using Linux, all of the software is freely available. Once the PVM software has been installed on the PCs and the user has written the parallel application and the various parts of the application have been installed on the PCs, the PVM is started up at the console and the application is started by hand. Then the application performs its task, using the facilities of the PVM package to exchange information among the segments running on the different PCs until the program ends.

Staff members in the Department of Earth Sciences collect land-based surface seismic data by laying down in a straight line on the surface of the earth a set of recording devices (geophones), and by setting off a small explosion (shot), just below the surface near one end of the line of geophones. Recordings (traces) are made for a few seconds at the geophones of the reverberations that result from

energy of the explosion reflecting off geologic structures below the surface. The effect is something like a geological ultrasound. The resulting collection of geophone traces for the shot is called a shot gather. Then the geophones are moved a short distance along the same line as those of the previous shot gather and the whole procedure repeated.

In the end, one can end up with tens of thousands or hundreds of thousands of traces, grouped according to the shot locations. The hope is that, by analyzing the reverberations recorded at the surface of the earth, the geologic structures below the surface can be determined.

One of the basic problems in the analysis of seismic data is that, unless a reflecting subsurface interface is horizontal and directly below the shot and the shot is directly below a geophone, the image of the interface on the time traces does not coincide with the true location of the interface in space. Seismic migration refers to any of the algorithms that attempt to move the images in the time traces to the true locations of the reflecting surfaces by using information about the speed with which the energy from the shot travels through the types of rocks known or assumed to be in the subsurface.

The resulting image of the subsurface, with all of the reflecting surfaces in their "true" locations, is known as a migrated depth section. Notice that the original traces are in time distributed over space, the space referring to the geophone locations along the shot line.

On the other hand, the migrated depth section is in depth across space, the depth referring to the depth below the surface and the space to distances along the shot line. One particular seismic migration algorithm, called migration by aplanatic surfaces, generates a partially migrated

section for each individual trace, which is defined by the corresponding geophone location and shot location. The individual, partially migrated sections are then simply added together, just as a series of overhead transparencies could be overlain, to produce a complete migrated section.

After the traces have been col-

High performance, distributed computing can be had for relatively little cost. This would allow students learning to program to branch out into parallel programming...

lected significant computer time is required to analyze the data. A master program on one of the PCs reads each of the input traces and doles them out, one by one, to a worker program running on each of the other PCs. Each of the worker programs requests a trace from the master program, generates a partially migrated depth section for that trace, and asks the master for another trace, summing the partially migrated sections as they are produced. After all of the traces have been sent by the master to the workers, and the workers have generated their own, individual partially migrated sections, the workers send their

partial results back to the master program, which then adds them all to produce the final migrated depth section.

High performance, distributed computing can be had for relatively little cost. This would allow students learning to program to branch out into parallel programming, an area that has seen an increased amount of activity over the past few years as new applications have demonstrated its usefulness.

The concept of parallel process is not new. Project Beowulf has been active at NASA's Goddard Space Flight since 1994. Beowulf is a project to produce parallel Linux clusters from off-the-shelf hardware and freely available software. There are now dozens of Beowulf-class systems in use in government and at universities worldwide.

Because of the success of trial runs in the Department of Earth Sciences at Memorial University, a new computer farm has recently been installed. The new farm consists of eight off-the-shelf PCs each containing two 300MHz Pentium II processors. The speed improvements have been impressive. One particular problem completed using the traditional high-end hardware and software took 125 hours. On the new parallel processing farm the same task was completed in 1 hour and 25 minutes. Ω

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The Office of Learning Technologies

The Office of Learning Technologies (OLT) was established within Human Resources Development Canada to work with partners to expand innovative learning opportunities through technologies and to share information about their availability and use.

The OLT is achieving these goals through the Contribution Program, which supports assessment, research and testing related to the use of learning technologies. Under the Contribution Program, assistance is made available for innovative projects which stimulate the use of technologies for lifelong learning by diverse groups of Canadians, and contribute to increased understanding of learning technologies. Projects are generally cost-shared and must have a broad impact or transferable findings.

A call for proposals is announced annually. Information about submitting proposals can be found on the OLT Web site at <http://olt-bta.hrdc-drhc.gc.ca> and interested parties can be added to the OLT mailing list.

The OLT Web site is a comprehensive source of information about the program and learning technologies. Some of the pages found on the site include an overview of the program, guidelines for submitting pro-

posals and a database of funded projects. The site also contains a database of more than 27,000 books, periodicals, articles, research reports, and other documents and materials related to learning technologies.

The document, "Approved Contribution Projects", provides summaries of previous OLT funded projects and is available as a print version or electronic file. A fully searchable OLT Funded Projects Database is also located on the OLT Web site. The database allows searches for projects by province, call date, sponsor, title, subject, keyword, or by project number. Hot links to sponsors' Web sites and project home pages are provided where available.

The online resource, "Contribution Program Guidelines and Application Procedures", outlines the types of projects that are eligible for funding, the assessment criteria used to evaluate proposals, information to help in preparing an application, and the review process. The guidelines are subject to revision with each call, so it is important to use the most current version when preparing a proposal. These will be posted on the Web site at the time of each call, and sent to those on the mailing list.

The OLT has funded many projects from various parts of the country. At the University of Regina researchers are studying the feasibility of a project to identify the learning needs of adults age 55 and over, help them overcome their fear and resistance towards new technologies, and give them access to technology-based learning opportunities adapted to their needs. Interactive Multimedia Technology in Nursing Education is a research project being conducted at Saint Francis Xavier University Extension Department and Nursing Department. The project will test the effectiveness of CD ROM/Internet technologies in a distance education

program for working registered nurses in Nova Scotia. A project sponsored by the Canadian Association of Principals is developing a strategy to prepare school principals to use learning technologies to transform learning, support adult learners, inform parents, train staff and create community centres for lifelong learning.

The OLT, with industry partners, also publishes research and information on learning technologies. Their latest book, *Learning on the Information Highway: A Learner's Guide to the Technologies*, was a collaborative effort with Chenelière/McGraw-Hill and was released at the Annual Conference of the Association of Canadian Community Colleges in Winnipeg in May 1998. The plain language guide tells the stories of 18 adult learners from across Canada. They share their experiences about the opportunities and challenges of learning on the information highway, and offer advice to other learners. The guide is a companion piece to the "Lifelong Learning on the Information Highway" series. This series engages partners in education and industry in researching and testing the use of technologies to enhance learning and expand its accessibility. Ω

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Feature Article

Professional Development and Action Research

by
Gordon T. Brockerville



Professional development (PD) is a dynamic process of learning that leads to a new level of understanding and heightened awareness of the context in which teachers work that may compel them to examine accepted policies and routines. Viewed from this perspective, Daniel L. Duke at the Department of Educational Leadership and Policy Studies, Virginia University, contends that we must go beyond advocating to achieving PD. Attending conferences and in-services is only part of the PD learning cycle. To complete the cycle, opportunities must be provided to reflect on these learning endeavors and our teaching experiences with the intent of refining and extending our thinking and learning in education. In short, beyond talking about professional development, we must live it.

An alternative form of knowledge pursuit that engages teachers as active developers of knowledge can be employed to complement and

enhance conventional forms of PD. PD must be viewed as process-oriented rather than product-oriented. Educators need a model of PD that brings groups of teachers together regularly to reflect on who we are, what we value, who we teach, what we teach, how we teach and why we teach the way we do.

This concept of PD means going beyond the dominant view that knowledge about education is generated by academic researchers outside the classroom and then imposed on teachers. In the words of Donald Schon, in his book *Educating the Reflective Practitioner*, "the question of the relationship between practice, competence and professional knowledge needs to be turned upside down. We should start not by asking how to make better use of [academic] research-based knowledge but by asking what we can learn from a careful examination of artistry, that is, the competence by which practitioners actually handle indeterminate zones

of practice".

According to Jean McNiff, a British educational consultant, the alternative view considers educational inquiry as a process that enables teachers to create their own knowledge, that teachers own their knowledge, and are seeking to understand their own professional practices with a view to improving them.

One possibility for renewed PD is the concept of teacher-as-researcher engaged in practical inquiry about his or her teaching. As action of some sort is often associated with practical inquiry it is also referred to as action inquiry. Broadly defined, action inquiry is an umbrella term for the use of any kind of 'plan, act, describe, review cycle of inquiry' into action in a field of practice. According to David Tripp, Murdoch University, Australia, the term includes any form of deliberated inquiry in which action and inquiry proceed together with and through each other. There are many kinds of action inquiry, all of

which are characterized as following a cycle of phases in the same order. Two such types of inquiry are 'reflective practice' and 'action research', both of which are receiving much attention in the literature as having potential for teachers to reclaim their voice in education.

According to Tripp, reflective practice is any systematic and deliberate on-going use of a 'plan, act, describe, reflect sequence' in which the reflection is a conscious attempt to evaluate the process and outcomes of the action as experienced by the actor. In our case, we engage in a cycle of thought and action based on our professional practice; that is, our everyday experiences and personal knowledge about teaching in our particular settings. Based on Schon's work, three types of reflections pervade the literature. Reflection-on-action is reflection on practice and our actions and thoughts, undertaken after the practice is completed. Reflection-in-action is reflection on phenomena and our instinctive ways of thinking and acting in the midst of action. The third type, reflection-for-action, is a synthesis of the other two. According to staff development specialists, Joellen Killion and Guy Todnem, reflection-for-action is a process that encompasses all time designations, past, present and future simultaneously. In sum, reflective practice inspires us to engage in continued knowledge development to further our understanding of school and classroom events.

John Smyth, at the School of Education, Deakin University, Australia draws on all three types of reflection. In a call for personal and professional transformation he contends that teachers must theorize about their practice as a form of empowerment. This view moves reflective practice towards action research.

Action research is a more deliberate action based on and informed by recognized research procedures. According to Tripp, the difference between action research and reflective practice lies with a specific data creation and analysis phase in action research that is not necessarily part of reflective practice; however, informal reflection still continues within it. This conception of action research is similar to that of Richard Sagor, a member of Project LEARN (League of Educational Action Researchers in

Becoming Critical: Education, Knowledge and Action Research. They write, "Action Research is simply a form of self-reflection enquiry undertaken by participants in a social setting [including educational settings such as schools] in order to improve the rationality and justice of (a) their own practice, (b) their understanding of these practices, and (c) the situation in which the practices are carried out."

James McKernan, in his book *Curriculum Action Research: A Handbook of Methods and Resources for the Reflective Practitioner*, states that, "Action Research is the reflective process whereby in a given problem area, where one wishes to improve practice or personal understanding, inquiry is carried out by the practitioner first, to clearly define the problem and secondly, to specify a plan of action including the testing of hypotheses by application of action to the problem. Evaluation is then undertaken to monitor and establish the effectiveness of the actions taken. Finally, participants reflect upon, explain developments, and communicate these results to the community of action researchers. Action research is systematic...self-reflective inquiry by practitioners to improve practice."

Put more simply, action research for teachers is about studying what is happening in our school and deciding how to make it a better place by changing what and how we teach and how we relate to students and the community. It can be carried on by a single teacher or by a group of teachers working collaboratively (sometimes with students) on a given problem area. Emily F. Calhoun, Director of the Phoenix Alliance in St. Simons Island, Georgia envisions using action research in self-renewing schools. Her book, *How to Use Action Research in the Self-Renewing School*, is a practical guide to con-

One possibility for renewed PD is the concept of teacher-as-researcher engaged in practical inquiry about his or her teaching.

the Northwest), Washington State University. He indicates a flow of six sequential steps:

1. formulating a problem
2. planning for data collection
3. collecting data
4. analyzing data
5. reporting results
6. taking action

There are as many definitions of action research as there are researchers; however, the most widely cited is that of Wilfred Carr and Stephen Kemmis, in their book

ducting action research to improve student learning. In another practical book, *How to Conduct Collaborative Action Research*, Richard Sagor of Project LEARN describes how teachers can use action research to both improve the teaching-learning process while making meaningful contributions to professional development.

The current education reform and school restructuring in Newfoundland and Labrador is moving in paradoxical directions. At once, there is a move towards shared decision-making at the school and school board level (i.e. school councils) while there are tighter controls over curriculum and standards (i.e. Atlantic Curriculum). In this paradoxical atmosphere, teachers, schools and school boards are accountable to all stakeholders for policies, programs and practices. It is not enough that teachers be mere implementers of programs and policies. They must have a voice in development and evaluation.

Informed decision-making must be the norm and teachers will have to be more deliberate in documenting and evaluating their efforts both individually and collectively. The infrequency and passivity of conventional PD will most likely not measure up to the new demands facing teachers. Action Research is a viable tool for teachers to take on the challenge and claim a voice in shaping their practice. Ω

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(STUDENTS, continued from page 3) on a grander scale. Where extensive access to the latest technology of networks and computers was relatively rare just five years ago, we have come to see students' use conspicuous and valued by many. They have had a chance to meet someone new, correspond with another at a distant location, collect and pass on information to convey an international perspective that previously had been difficult to find and access in detail.

If you have not yet had a chance, spend some time accessing and reviewing the many Web pages developed by Newfoundland and Labrador students. You might start with just a set of words in a search pattern similar to that which was described earlier in this article. One way to do this is to proceed to the STEM~Net Home page (<http://www.stemnet.nf.ca/>) and then follow the links featured around the lighthouse. You will eventually reach the "Internet on-ramp for K-12 school Web pages" (<http://www.stellar.nf.ca/>) that will provide you with a "search button". You can then enter the term you are looking for or go directly to a specific school and begin to surf through their pages. With little effort you will be provided with the information you are seeking and will agree that Newfoundland and Labrador students have used the implements of the new information age to provide unique collections that describe their region and culture. They illustrate reasons that the students are deserving of their international recognition.

Lastly, I cannot finish the series without thanking all the members of the Prospects' Advisory Board who have continued to encourage my musing over HRD Agreement projects. The opportunity they have afforded me was indeed a cherished reward. Ω

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(DESIGN continued for page 23) Course Web sites should provide more than just electronic page turning for the learner (Starr, 1997). While the Web provides a means for higher level instruction, it can also be used quite successfully for the more traditional instructional strategies. The medium should not dictate the design. Designers should think beyond traditional classroom practices and focus on the needs of the learner. Ω

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COOPERATION

This issue of Prospects marks the end of the Canada/Newfoundland COOPERATION Agreement on Human Resource Development. Signed in January, 1993, the HRD Agreement funded a total of 596 projects (total value of \$34.2 million) throughout Newfoundland and Labrador, mostly in the education system--both K-12 and post secondary. Many of these projects have been featured in earlier editions of Prospects magazine. Details on each project can be obtained by visiting the Department of Education website: <http://www.gov.nf.ca/edu/eduhome.htm>.

In addition to the members of the Management Committee, many individuals contributed to make the HRD Agreement a success. Visionaries behind the scenes preparing the background and rationale included Robert Thompson, Frank Marsh and Andrea Dicks. During the startup of the Secretariat, Harold Press, Carol Ruby, Mun Batstone, Hayward Harris and Beverly Stanley prepared the initial drafts of guidelines and administrative procedures. Both Harold and Hayward served a period as Provincial Director and Carol served as Federal Manager of the Agreement.

Representing the federal partner, Atlantic Canada Opportunities Agency, Ann Marie Roche served as project officer; and representing the provincial partner, the Department of Education, Claudette Hillier served as Administrative Officer for the entire five-year period. Other individuals who worked with the Agreement for varying periods are listed as follows:

ACOA

Jocelyn Chaytor
Katherine Parsons
Fred Hubley
Don White
Laura Chafe
Cheryl Powell
Roxanne Power
Elizabeth Montgomery (D. April 1997)
Tracy Cole
Randy Devine

Department of Education

Nellie Burke
Kent Farrell
Barb Case
Brad Fisher
Jean Prosper
Alan Skinner
Leon Cooper
Kevin King
Wayne Dyke
Carole Thistle
Joanne Murphy

During the five years, a number of Co-op students worked with the Secretariat as follows: Shane Curnew; John Foley; Corey Button; Elizabeth Dawe; Dawn Jenkins.

A number of other individuals provided insight and guidance in the assessment of proposals. While there were too many to mention individually, a special 'thank you' goes to Frank Shapleigh, Harvey Weir, Edie Melvin, and Bruce White who assessed proposals in the area of technology, high achieving student initiatives and school improvement respectively.

To each and every individual who played a role in implementing this very successful agreement- Thank you! Your efforts are appreciated by the applicants who benefitted from the many innovative initiatives funded.

Nellie Burke, Director (A)

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